AN

INTRODUCTION

TO

Perspective, Drawing, and Painting,

IN A SERIES OF

Pleasing and Familiar Dialogues

BETWEEN THE AUTHOR'S CHILDREN;

Illustrated by appropriate Plates and Diagrams, and a Sufficiency of

Practical Geometry.

AND

A COMPENDIUM OF GENUINE INSTRUCTION,

COMPRISING A

Progressive and complete Body of Information,

Carefully adapted for the Instruction of Females,

AND SUITED

EQUALLY to the Simplicity of YOUTH and to MENTAL MATURITY.

WITHOUT TRUE GENIUS, VAINLY YOU ASPIRE!
WITHOUT SOUND ELEMENTS, IN VAIN YOUR FIRE!

BY

MR. HAYTER,

and Crayons,

ents of the Art.

THE SECOND EDITION, CONSIDERABLY ENLARGED AND IMPROVED.

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FRONTISPIECE.



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PERSPECTIVE EXPLAINED:

IN

SERIES OF DIALOGUES

BETWEEN

THE AUTHOR'S CHILDREN,

GEORGE, ANN, ELIZA, AND JOHN.

Introduction.

Eliza. My dear brother, when will you teach us perspective? You know I do not love a state of *darkness;* and you have told me that a painter might as well be blind, as ignorant of this most important *branch* of his art.

George. Indeed, my dear Eliza, it is of the very first importance; and is rather the *main root,* or foundation of truth, in a picture, than a branch. I am very happy to find you so earnestly disposed to study it; and if sister Ann is at leisure, and little John will but attend, I will now endeavour to make you acquainted with all the necessary rules and principles thereof, and hope you will all pay the most patient attention.

John. Why, brother, you know I can draw, and yet I do not understand perspective. *What is it?* Shall I be able to draw better when I know?

Ann. You know, my dear boy, you have always something to *draw from;* which, it is granted, you imitate prettily; but what would you do without a copy ready designed to your hand? Brother will soon show you the advantage of knowing perspective.

George. That is well observed, Ann; and I shall proceed—First, to call your attention to its general and distinguishing character, which is, TO REPRESENT OBJECTS AS THEY APPEAR, AGREEABLE TO THEIR REAL FORMS, DIMENSIONS, AND VARIOUS DISTANCES, BY DRAWING AND PAINTING ON A FLAT SURFACE; the eye being a single point, so wonderfully constructed, as to receive and comprehend all the visible matter which may appear, within a certain space, at one view, or action of sight, producing a perfect idea of their *real forms,* by an association of lines and angles *totally different.* Yet the *form* of a true and judicious perspective representation will so perfectly agree with the knowledge conveyed by the absolute or geometric form, that the one will stand as an evidence, or test of the truth of the other; as thus—In viewing a street (which admit to be), level, straight, parallel, and uniform in the building, it will appear to *diminish* according to the distance, *converging towards a point* at the furthest end—THUS A PERSPECTIVE REPRESENTATION WOULD DESCRIBE IT—which would preserve and convey to the mind a perfect idea

of the geometric and real forms presented to the view; although so very different, that there could be but *one* level line in the whole drawing; and *no two* parallel, with perhaps the trifling exception of what might be seen of the square parts of chimneys, some small projections or returns, or an accidental cross street. *Now for an experimental proof*—Go to the window,* and look stedfastly through one of the squares of glass (which you know is a flat surface, and which constitutes the *transparent plane* in perspective); then, if you could keep yourself stationary, within reach of the glass, you might trace, with a pen, *a proper perspective outline* of the scene or objects in view; and by laying a thin wash of gum water, or isinglass, on the glass of the window, you might trace the scene, &c. with a black or red pencil, and then place a piece of drawing paper over it, and trace it off on that, so as to proceed to make a finished drawing.

Ann. But, brother, you must tell us how to keep the eye

* Although the Author began his work with a note, he conceives a general objection to notes, in books which are intended for the information of *young readers*: especially such as have not received a regular education, who are too often unaware of their importance, and pass them by as irrelevant to the subject, or (more probably) without a thought. Yet he cannot here avoid repeating the instruction given in the latter part of that *note*: for the novice will read in vain, who will not be at the pains to make *this*, and every following practical experiment, to thorough conviction, before he proceeds.

in one position, as I instantly perceive the operation depends on that.

Eliza. Oh, sister, that may be contrived many ways!— I long to try to take a view by this method. I wonder painters do not use it: I feel as if I wanted no further information on the subject.

George. A very complete apparatus is made, to take views in outline corresponding with this method, and is used where expedition or a want of knowledge of art makes it necessary: but I direct you to the tracing on the window only, to confirm to your ideas *this leading principle,*— that in every thing you draw, you are to conceive you are drawing, on a glass or transparent plane, *objects* which are supposed to be on the other side. But you are not to sit down with these contrivances, if you intend to become acquainted with the art of painting; as it will be absolutely requisite for you to learn all the elements, beginning with practical geometry, sufficient knowledge of which I will give you in due order, and leave all the secondary means of *picture-making* to those who will not acquire the art of doing without them.

John. What do you mean, brother, by "*secondary means?*"

George. All copying, by measuring, tracing, squaring, and pouncing, and all mechanical aids in making copies of pictures.

Eliza. Then engravers are but secondary artists?

Ann. I believe, sister, this is too hasty a conclusion; for, by what I have already learned on the subject, engraving (although dependant on some mechanical means, to obtain a certain, and correct, outline of the subject of imitation) is one of the great departments of art, and may be as excellent *in its way* as painting itself.

John. I beg pardon, sisters, but I think you should not talk about engraving now: it is a hindrance.

George. Now to convince you of the great advantage of a regular acquaintance with the art of perspective, please to observe, that architects, after they have drawn the geometrical plans and elevations of a building, can (by *due knowledge of this art,* united with a tolerable good taste for landscape) give very true pictures of intended buildings or improvements before they are begun,—the forms of trees excepted of course.

Eliza. What, entirely without seeing them?

George. Yes, as perfectly as you could trace them on a *transparent plane,* after the whole is completely built and planted.

Ann. How delightful! What an art it must be!—I cannot help thinking it very difficult.

Eliza. Why, there seems to be a kind of prophetic power in perspective, if one is enabled thereby to show the true picture of a place before it is built. I have also some serious notions of the difficulty.

George. Never fear, sisters. Attention and perseverance will surmount great difficulties; and *perspective being attainable by rules*, must not be classed among the greatest. I will do all in my power to make the whole as easy and pleasant as possible.

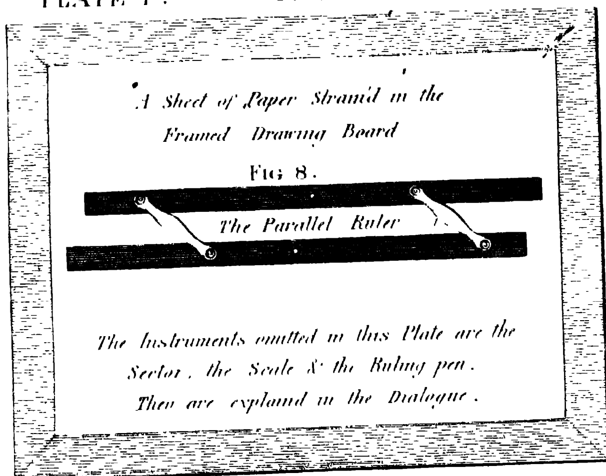
John. Then you know, Eliza, we shall be able to *prophesy* pictures without *tracing*.

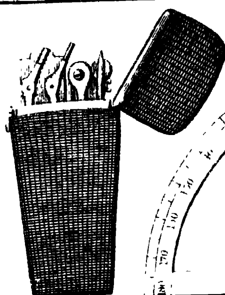
Eliza. And yet, Mr. *Smart*, I have conceived a great partiality to this drawing on a glass; for I have been to the window, and fixed my eye so attentively, that I could imagine the window frame to be a picture frame, and all I saw beyond appeared to be a perfect picture. Do come and look, Ann, and if you take my idea, you will be delighted; for though the scene is not composed of the most picturesque objects, yet only consider it as I do (a painting), and tell me if ever you saw a better?

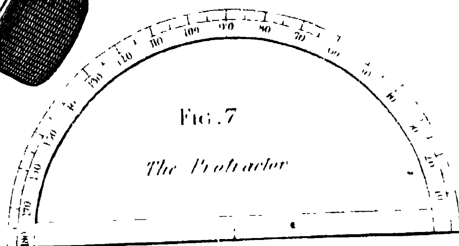
Ann. Oh, Eliza, I almost envy you this step! It has taken my imagination instantly. You may well call it a perfect painting, although the scene makes it a poor picture. Well, who could have thought we should ever feel so much pleasure in looking towards that dull street?

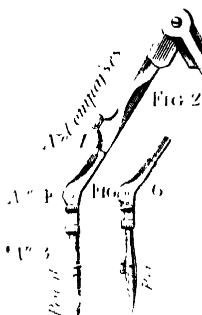
George. Now, sisters, if only a right idea of perspective has given you so much pleasure, you may fairly conclude that a right knowledge of it is worthy the study: for to study we must proceed: and I hope you will never quit a

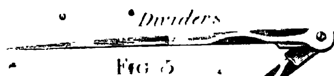
PLATE I.

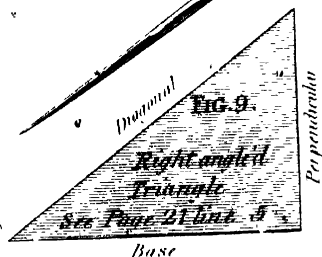

FIG. 1.
A Sheet of Paper Strain'd in the Framed Drawing Board
FIG 8.
The Parallel Ruler
The Instruments omitted in this Plate are the Sector, the Scale & the Ruling pen. Then are explaind in the Dialogue.




FIG. 7
The Protractor


FIG 2
FIG 6


Dividers
FIG 5


FIG. 9.
Diagonal
Right angled Triangle
See Page 21 Line 5
Perpendicular
Base

subject, or suffer me, till you *clearly* understand me. And let me entreat you to *follow* my explanations attentively, enquiring freely *on what has passed*, but *do not lead on too* fast by looking forward, as that may tend to that sort of dispatch which must be considered more a desire *to get rid of a lesson*, than to become acquainted with it.

On Geometry, and the Use of the Instruments.

Ann. PRAY, brother, is not *practical geometry* the proper introduction to perspective?

Eliza. Oh, geometry!—the word fills my mind with alarm.

George. And pray, sister, did not the word *alphabet* once alarm you; and afterwards the words *grammar, French, geography, gamut*, &c, &c.? What say *you* to geometry, my brave John?

John. I do not intend to be alarmed at a word, I promise you. I suppose you will soon show us the meaning of *geometry*.—What is it?

George. It practically teaches the methods of drawing lines, squares, triangles, circles, ovals, polygons, &c. with truth, and proportionate to any scale you may find occasion to adopt. But it may be some considerable

gratification to the *alarmed* to inform them, that little more than a dictionary of the general figures, and a very few practical problems, will be all that is requisite to our progress in perspective. *Do you know where* to find the case of instruments and the parallel ruler?

John. You know *you always clean them and lock them up safe* in your drawer.

George. Here, John, take the key and bring them to me, and I will teach you how to use them; and I hope you will never forget that you found them *clean* and *safe* when your first began to learn the use of them; for if you let the instrument get out of order, you will soon feel the inconvenience of it.

John. Here are the instruments, brother (Plate I).— Are we all to have instruments and drawing boards?

George. Of course; and I must observe, that many a genius may be lost for want of the possession and knowledge of these simple keys to the doors of art. The framed drawing board (Plate I. Fig. 1.) is made to any size you choose: it only requires attentive inspection to know how to put the paper on it. First, cut a piece of drawing paper, about an inch longer and wider than the pannel: pass a clean damp sponge over the *back* of the paper (*the back of the drawing paper is that side* on which the maker's *marks read backwards*); then take out the pannel, and place it even on the paper, and lift up the paper and

pannel together, and place them into the frame; press it well up to the front, and replace the two bars behind, and it is ready to draw on.

Ann. Are these sort of drawing boards absolutely requisite?

George. No; draftsmen paste or glue the edges of very large sheets, and *lay them down* on smooth boards: this is the most usual method with architects.

Eliza. Please to tell us the process.

George. First, observe that you damp the *back of* the paper, and let it diffuse till it is *pliant;* then paste about half an inch (quickly) of the edge of the paper. Some double back as much of the paper as they mean to paste or glue; but I think it best, when pasting, to lay a flat ruler, as a barrier to the paste. If you want to use the paper instantly, you must *glue* the edge, as that will bear drying by the fire: the pasted edges will not, but must dry gradually. It is well to lay down paper for drawing, on the evening previous to the day you wish to draw on it. Recollect to use glue quick, and stick the part you glue to the board as you proceed, for glue will set, or *chill,* in an instant.

John. I hope, brother, the paper will soon be quite smooth.—I want to see you begin drawing.

George. I must first explain the instruments to you, to which I beg you will pay great attention: now take the largest compasses (Plate I. Fig. 2.) out of the case, and by

unscrewing that little screw at N° 1, you may take out the steel leg: take care of it: then take that instrument out of the case which has a lead pencil in it, N° 3, and place it in the compasses where you took out the steel leg, and turn the screw tight again; thus we are provided with the means of drawing the circular parts of geometrical drawing.

Ann. That is very complete: will you tell me, brother, why there is a joint (N° 4.) in the pencil leg you have fixed in the compasses, as there is not one in the steel leg which you first took out?

George. Were it not for the joint, the pencil would lay too much on its side when a large circle is required, and the line would of course be broad; but by bending that knee or joint, you can draw to the full extent of the compasses, perpendicular to the paper: this sort of precision is to be observed in all geometrical studies.

John. And what are those compasses for, which are without any joint or screw? (Fig. 5.)

George. They are to take dimensions with, and are called *dividers*, and are nicely adapted to set off any number of equal parts, &c.

Eliza. Here is another leg with a joint in it; (Fig. 6.) what is that at the other end of it, with a little screw?

George. That is a steel drawing pen, to place in the compasses after the pencil outline is correct; and you are therewith enabled to ink in all the *circular* parts of your drawing.

John. Then I suppose this long steel pen which has no joint, is to ink in the *straight* lines?

George. Very rightly supposed, John.

Eliza. What is this little rule for, which has so many lines and figures on it—I mean that with a joint?

George. You appear perplexed at this instrument: come, I shall soon relieve you; it is called the *sector*, and is particularly useful in many points of mathematical inquiry; but almost entirely useless in the *practice* of perspective: yet I hope you will take some opportunity of learning the use of the *line of lines* on one side, and the line of polygons on the other.

Ann. Where shall we find the proper explanation?

George. In the Encyclopedia, or Kerby's Dr. Brook Taylor's Perspective: there is also a cheap pamphlet on the use of the instruments.

Ann. And what use are we to make of this neat little thin rule, which has such a number of lines and figures on it? will you please, most indulgent master, to dispatch this intricate article, as you did the sector?

George. Your request is granted, without any indulgence on my part; as you will only use it for a nice ruler. But I may tell you that the lines and figures are only proportionate scales; as, suppose you consider any one whole division, on either of the lines, as an inch, foot, yard, pole, furlong, mile, or degree, you will find the proportionate

subdivisions at the end of that line; and on the other side is a line of inches, each divided *by ten* (or what is properly called decimally), and below that is a decimal scale, which, by means of the diagonal divisions at each end, exhibits the smallest part of a tenth that a draftsman can possibly distinguish by lines.

Eliza. I think we shall not, hereafter, be alarmed at intricate appearances, since your explanations are so very intelligible.

Ann. We were both cowards, Eliza; but George will pardon us.

George. Pardon, sisters! you know it cannot be long since I looked on these instruments with the same ideas of them you seemed to entertain; there is nothing to pardon, but a little impatience. Deliberate attention will render the whole as plain as that which I have already taught you.

John. Please to tell us what this half circle of brass (Fig. 7.) is for? then we shall know all the instruments.

George. It is called the *protractor:* it is used to find the number of degrees contained in an angle; as thus — Ann, draw a right line, and place the straight edge of the protractor truly on it; then make a mark on the paper, at the top of the semicircular part of the protractor, at 90, and (without moving the protractor) make a mark on the line exactly at that little mark on the straight edge of the pro-

tractor, which divides it in half, and which is the centre of the circular part of the protractor: now take it off, and draw a right line through the two marks you have made on the paper, and it will be exactly perpendicular to the line you first drew. From this you may remember that a right angle contains 90 degrees, or a quarter of a circle.

Ann. I see any other angle may be found in the same manner; do not you comprehend it, Eliza?

Eliza. Not quite so clear as you appear to do; but brother will favour me with another example.

George. Come, Ann, show your sister how to find the angle of 75 degrees.

Eliza. I have it, George! it is only to mark at 75, as Ann did at 90, and draw the line to the centre.

John. Oh! any body may do it: but I cannot tell what use it is to know it.

George. I will tell you, John: one advantage you have gained by it; you know you are very attentive to conversation; now suppose you had heard any one say that the sun was about 30 degrees above the horizon (before I taught you this), could you have conceived what height the sun was?

John. No, brother.

George. Can you now?

John. I must consider a little, brother; come, ask Ann and Eliza, and let me hear how they answer.

Ann. I think a line drawn from 30 on the protractor to the *centre*, would be in the same direction as the line from my eye to the sun, when it is 30 degrees high, or above the horizon.

Eliza. But the difference between a degree on this little instrument, and the vast extent of the circle the sun is supposed to make to the earth, or rather the earth to it, seems to me to bear no comparison.

George. The observation is allowable to those who are uninformed; but you must henceforth *remember, that the three hundred and sixtieth part of the smallest circle* that can be drawn, or conceived, is as much *one whole degree*, as the three hundred and sixtieth part of the *largest circle* imaginable in *the vast immensity of space!* and 30 degrees on the one, would form precisely the same angle as on the other. Now, Eliza, for proof: take a large sheet of writing paper, and draw an angle of 30 degrees (let the point, or centre, be near the middle of the paper): now place the steel leg of the *pencil* compasses on the point of the angle, and strike the largest circle the paper will admit; now strike the smallest you can, and two or three intermediate circles, *and observe*, that the space between the two lines which forms the angle of 30 degrees, will be found to be exactly one twelfth part of each of the circles, where they cross them.

John. Now, brother, I understand how to conceive

the sun's height, when I hear the number of degrees mentioned; and I love the instruments the more I know them; but I always thought them very difficult things till you began to explain them. Come, will you please to explain the parallel ruler?

George. (Fig. 8.) It almost explains itself. Practice, with care and caution, will render it familiar to you: when you have drawn a line, and require another parallel to it, take care to keep that limb of the ruler which you do not want to move, quite still, and firm to the paper with one hand, and move the other side, or limb of the ruler, upwards, or downwards, to the point required; then hold *that* firm to the paper while you draw the line: if this is not nicely attended to, you will loose the parallel, and confuse your drawing; indeed, the whole use of the instruments depends on precision, insomuch, that the words "*geometrical precision*," are the terms made use of to convey an idea of the utmost correctness.

Explanation of the Terms and Figures in Practical Geometry.

George. PRACTICAL GEOMETRY now will engage our whole attention for a short space of time; and then, John,

I will draw in perspective: you must keep your eyes on Plate II.° while I explain each figure.

A. This is only a single dot or point, and is the first term in practical geometry: it is to be conceived a point without length, breadth, or thickness.

B is a *straight line,* which you may imagine to be a number of dots united, having length without reference to breadth or thickness.

C. These two figures are *curved lines,* having no straight part.

D is a *right-angled triangle,* or an angle of 90 degrees.

E is an *acute angle,* or less than 90 degrees.

F is an *obtuse angle,* or more than 90 degrees.

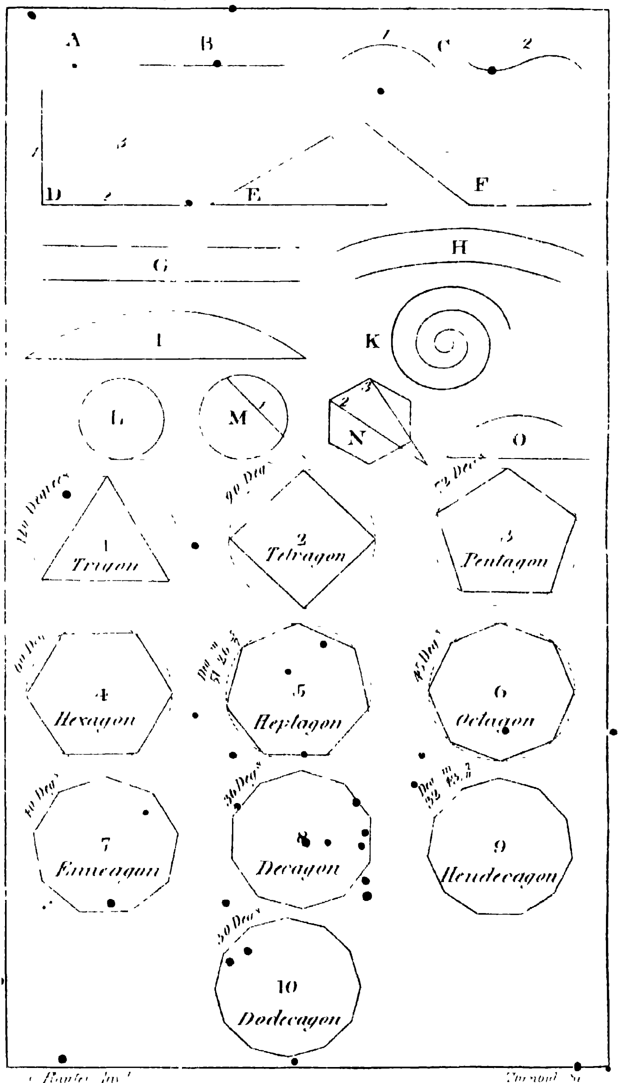
G and H *are parallel lines:* they always follow one another at equal distances. The brass semicircle of the protractor is as parallel as the straight part of it.

D, N° 1, is a *perpendicular line* to N° 2, because it is at a *right angle* with it. *Observe,* that line is always considered perpendicular to, a horizontal, or level line, which is at a *right angle* with it; but a *plumb-line* is the radical or original principle of the idea of a perpendicular, without any material exception to the object of our pursuit.

Ann. Can there be any exception?

George. Yes, when a plumb-line is suspended near the side of a mountain, it will be attracted out of its

PLATE II.



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vertical and proper direction, towards the centre of gravity. by the mountain.

Eliza. In what proportionate degree, brother?

George. You will find a full answer to your question in the Encyclopedia, under the word "*Attraction,*" which I beg you will read.

John. What is a plumb-line?

George. Tie your top-string to the peg of your top, and let it hang as a weight, and the string will be a plumb-line. You may have observed the bricklayer's building rule, that has a line and plumbet of lead: it is called the *plumb-rule,* by which they are able to prove the perpendicular of their work, which is a point of the utmost importance in building: the paviour's *levelling-rule* has also the *plumb-line.*

Ann. Then, as they are so very accurate in their works, I conceive we should not be less so in our imitations of them. Now I feel the force of your remarks on my first sketches; you used to say that the houses I drew were *falling down.*

Eliza. What an unpleasant sensation it produces! all my little landscapes will shock me; for houses, churches, castles, bridges, gates, and stiles, are all tumbling down.

John. Then the best way, I think, will be to burn them, and mind to do better in future.

George. Well said, John.

D. N° 2, is a *horizontal line,* and represents a perfect

level. it is the *base line* of this figure. The term *base line* is properly applied to that line on which a figure erected.

D, N^o 3, is a *diagonal line*, because it crosses the figure at opposite angles, and in its direction may be considered the *oblique line*: that is the geometrical term for a straight line, which is neither level or perpendicular.

J is a CHORD, or *subtense*: it is the straight line that joins the two extremities of an arc, exactly as the string of an archer's bow.

K. A SPIRAL LINE is a curve line issuing from its centre, and continually expanding, and going off from it, at every turn.

John. I can make a *spiral line* by rolling this narrow slip of paper round my pencil: and then letting it loose, it will be like the spiral line.

George. I like your observation, John; I shall soon direct you to the means of drawing one properly; let me first explain all the figures.

L is a TANGENT, which touches another line without cutting it.

Eliza. By the figure, it appears that the surface of the table would be a *tangent* to an *orange*; I wish you would make the experiment, brother.

George. The application deserves one; and we will divide it by cutting it into four equal parts: the lines which

will pass through the orange, in dividing it, are secants, and are explained in our next figure.

M. A SECANT is a line that doth *cut* or *cross* a figure.

N is another example, showing two secants through one figure.

O is the segment of a circle.

SURFACES may be comprehended under three terms: viz.—1st, the *plain* or *flat:* 2d, the convex: and 3d, the concave.

The geometrical *surfaces,* with which you should be well acquainted, are generally known by the name of polygons.

N° 1. The trigon, an equilateral triangle, three equal sides and angles.

2. The tetragon, or perfect square, four equal sides.

3. The pentagon, or figure of five equal sides and angles.

4. The hexagon, or figure of six equal sides and angles.

5. The heptagon, or figure of seven equal sides and angles.

6. The octagon, or figure of eight equal sides and angles.

7. The enneagon, or figure of nine equal sides and angles.

8. The decagon, or figure of ten equal sides and angles.

9. The hendecagon, or figure of eleven equal sides and angles.

N° 10. The dodecagon, or figure of twelve equal sides and angles.

These figures are to be described within circles, and all their angles must touch the circumferent line.

The number of degrees which are contained in one side of each polygon are marked, to show you that the protractor may be used to divide a circle into any number of equal parts, in the manner explained under its proper head — page 12, line 17.

Triangular figures are distinguished by the qualities of their angles, as a *right-angled* triangle, an *acute-angled* triangle, and an *obtuse-angled* triangle: see figures D, E, and F, Plate II; and the equilateral triangle, N° 1.

The distinguishing names of four-sided figures are as follow; see Plate III.

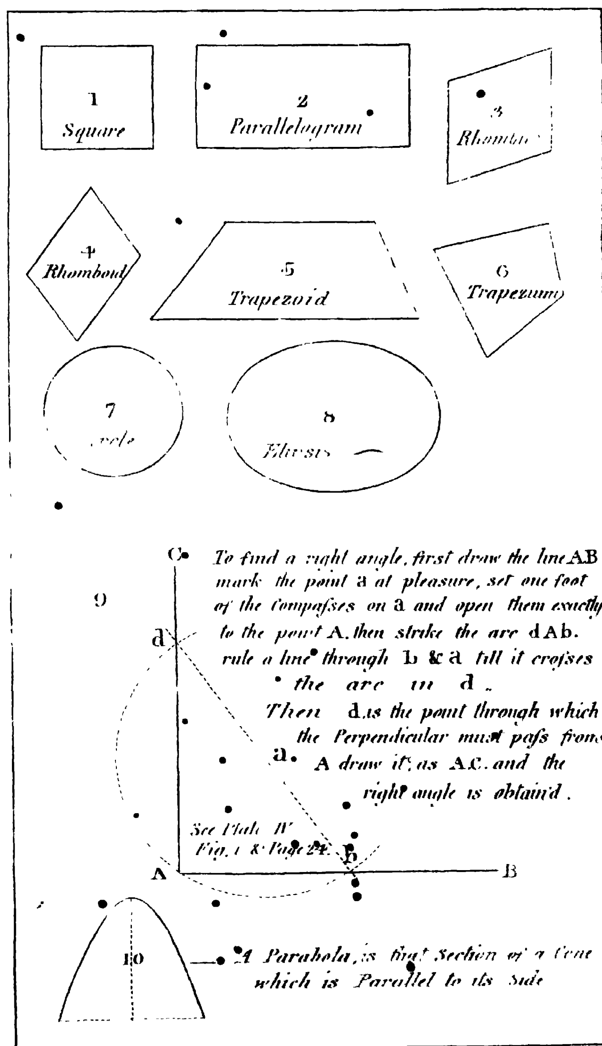
N° 1, *the square*: 2, is a *parallelogram*: 3, the *rhombus*: 4, the *rhomboid*: 5, the *trapezoid*, which has two opposite sides parallel, and the other two unequal: 6, the *trapezium*, has all its four sides and angles unequal.

The other two regular figures, are N° 7, the true *circle*; and 8, the *ellipsis*.

N° 10, the *parabola*.

There are various other irregular figures, and you may easily acquire a thorough knowledge of the whole, if you will study some good treatise on practical geometry; Le Clerc, or Nattes's, will be sufficient; but we shall

PLATE III.



Publish'd as

now proceed to our first object, *perspective*, and only call on the aid of as much practical geometry as we may require.

Ann. Here is a little triangular piece of mahogany; what is its use, brother?—Plate 1. Fig. 9.

George. One of its angles is made a correct right angle, for the purpose of obtaining right angles in a drawing, without the geometrical process.

Eliza. And what is the diagonal side of this instrument for? and why are not both the right angular sides of equal length?

George. My dear Eliza, you question leads us a little deeper into Euclid than our course of perspective requires; but this triangle (if properly made to measure 3, 4, and 5 inches, feet, yards, &c.) is so proportioned, that the squares of the two shortest sides added together, are equal to the square of the largest, or diagonal side.

John. What do you mean by the *square* of a side?

George. Multiply the side three inches by three, and that will be nine, or the square of three; then multiply four by four, and you have 16; which is the square of the next shortest side: add them together, and they make 25. Now square the longest side 5, and that will also produce 25, which stands as a general rule, that the square of the diagonal of a right-angled triangle is equal to the united squares of the two lesser sides. By this rule, builders set their large framing of roofs, &c.

square; and planners prove the truth of their proceedings thereby.

John. I wish, brother, you would show me how they make use of this rule?

George. I will give you one instance: now, suppose this *jointed two-foot rule* to be two pieces of timber, twelve feet long instead of so many inches; and you would lay them down exactly at a right angle: first, open the dividers to five inches (supposed feet); then lay the rule on the table as near a square as you can, and place one foot of the dividers exactly at three inches from the centre of the joint, down one limb of the rule, and move the other limb till the other leg of the dividers will touch the point, which is four inches from the centre, and the angle will be right. This one right angle, thus found, is a rule for the rest of their operations, as far as relates to the square. Now please to observe *strictly*, to take every opportunity of completing your knowledge on these subjects; for *a smattering* of any art or science will only pass with the ignorant, and must expose you to ridicule or contempt, whenever vanity shall lead you to advance your half-formed ideas to the proficient. Knowledge of this sublime nature is for use, not show; and every step you take in geometry ends so delightfully clear, that the student *seems to feel as if he had always known it.*

Ann. Can we begin perspective now?

George. By the means of an example in practical geometry, you know, sister, it will be requisite to have a right-angled figure, or parallelogram, to draw our designs in; and how shall we make the angles right?

John. I can do that by the protractor now, if you will tell me how long and how wide it must be.

George. If you will make your words good, I promise you it shall be rewarded with a new book. Come, draw the figure $3\frac{1}{4}$ inches long, and $2\frac{1}{2}$ inches wide; and explain your work as you proceed, in a clear manner.

John. (Plate IV. Fig. 1.) I first draw a line $3\frac{1}{4}$ inches long; then I shall set the straight edge of the protractor on that line, very even, and with the little mark at the centre of it exactly to one end of the line; then I shall make the mark at 90 degrees, as you told us, and draw a line through it, to that end of the base line whereon I placed the centre of the protractor, which I must mark exactly $2\frac{1}{2}$ inches long—that makes one corner, you know; now I have only to mark the length $3\frac{1}{4}$ inches from the top of the perpendicular I have drawn, and the width $2\frac{1}{2}$ from the point of the other end of the *base line*, and draw the other two sides to the mark I have just obtained, to complete it. See Plate IV. Fig. 1.

Eliza. Well done, John; this proof of your attention is worth a little library.

Ann. I am astonished and delighted!

George. This is success, indeed! You have merited the promised reward with great honour. Now I will teach you another method; see Plate III. Fig. 9.

Ann. This is so clear and easy, that, instead of intricacy or perplexity, I am charmed by the knowledge it promises. Are all the figures found as easily as a right angle?

George. They require much about the same degree of attention. I found no obstacle when I copied Le Clerc, except from the misprinting some of the letters referred to (as the edition I had was imperfect), and that did me some good, by exciting more attention than I otherwise need have given them: it is very easy to draw them, but, when drawn, they are themes for the most learned mathematicians.

Eliza. Are there any other methods of finding the right angle?

George. Yes, several, which you must learn from the book I have mentioned. We can begin perspective now, without any immediate call for more geometry.

Principles of Perspective.

ON THE HORIZON OF A PICTURE.—PLATE IV.

FIGURES 1 & 2.

George. Now let me remind you of the rule laid down in the first part of our conversations,—that this outline or

limits of the picture, N° 1, must be conceived to be the size of an *aperture*, through which you view the object of your study; and the glass surface supposed to cover this aperture is always to be understood as the *transparent plane*, on which the drawing might be made a perfect outline, and in drawing, in perspective, is always represented by a line called the *section line*, which will be further understood in proper course. Now, on viewing Fig. 2, you may imagine a level surface extending from the *base* line to the utmost visible distance: think it a smooth sea, if you please. The line which appears to meet the sky is called the *horizontal line*, and must be as high up in the picture as the spectator's eye; or, the spectator's eye is always to be as high as the *horizontal line*, for the one *always* determines the other.

Ann. As pictures are made of so many various dimensions, I should like to have some proportionate rule for the height of the *horizontal line*.

George. About one third the height of the picture seems to be the most general rule for landscape; but you are not confined to that proportion, as it may be sometimes proper to deviate.

Eliza. How are we to know when to make the *horizontal line* higher or lower than one-third up the picture?

George. When you take a view from an *eminence,* you must, consequently, have a high horizontal line, as conformable to the rule first given for its height (that of the *eye's height);* and if you make an *eminence* the object of your view, you must by the same rule have a low horizontal line. The antique, and all public statues, of great and noble characters, being placed on elevated pedestals, must of course have low horizons, as also whole length portraits of distinguished persons; but subjects of familiar life, or less noble characters, may perhaps be the better characterised by a higher horizon. Genius must digest all rules, but should never attempt to proceed without the knowledge of them.

John. Now, if I were to draw the likeness of *my little dog,* I must have a high horizontal line to the picture; because my eye must be considerably above him, unless I placed him on the table, which you know is not a proper place for a dog; but the portrait of a horse, or an elephant, would have a low horizon, inasmuch, as their height is above the level of my eye. Am I right, George?

George. You have comprehended me most happily, and your attention claims great praise. Such active and proper application of what I have taught you, is great proof of commendable attention.

Ann. I have seen some very strange-looking prints,

wherein (what I *now* understand to be) the *horizontal line* was almost at the top of the picture, and one might see over the tops of houses, and (even) partly down the chimneys, and over a vast extent of country: what name do you give this sort of view?

John. Brother told me it was a *bird's-eye* view.

George. And it is so called; because the height of the *eye* is determined, in such pictures, to be inaccessible to any eye but that of a bird, by which an extensive view can only be obtained. These sort of pictures are rather descriptive, and the chief pleasure they give is information: they convey a tolerable correct idea of both plan and elevation, in one piece, and are adapted to explain the positions of fleets or armies, the general view of an estate or fortification. Palaces, and other public buildings, have been thus represented.

John. I hope, brother, you will draw us a specimen of a bird's-eye view.

George. That you will find in the perspective view of the chess-board, Plate VI. Fig. 2. Now be *very* attentive; and instead of 64 *square inches*, which is the real dimensions of the *chequer* board, you must consider them so many square fields, each an *hundred yards* square: let this fix the scale of proportion with regard to the height of the *horizontal line*, and you will find it exactly four hundred yards above the base line, or level ground, which is

certainly a height inaccessible to any eye but that of a bird.

Eliza. Or a *balloonist's* (suppose we new name it), since balloons have, in all probability, rivalled the utmost height of the eagle.

Ann. The thought is a-propos; but the old name is established, and, conveying the proper idea, need not be changed: we must all thank you, brother, for your very satisfactory explanations.



On the Inclination of Levels to the Horizon.

George. Now you seem to comprehend the horizon as the utmost visible line of level land, or of water, you must also take for a rule, that *all level planes* (as floors, tables, shelves, ceilings, &c.) tend to the horizontal line of the picture, as directly so as level land, or water.—See Plate V. Fig. 1, where are represented five *level planes,* which you may call broad-shelves, or floors, and their undersides ceilings: observe, they all tend, or converge, towards the *horizontal line,* although two of them are below it, and three above; and (as they are determined by breadth) were they to be continued to the utmost extent of visible distance, their retiring edges would all appear to unite in *one point* on the horizontal line.

PLATE V.

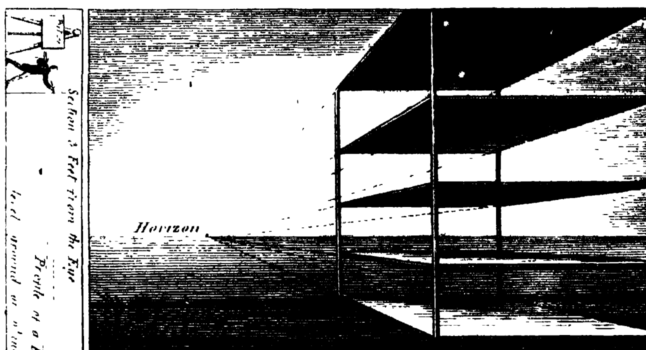


FIG. 1.

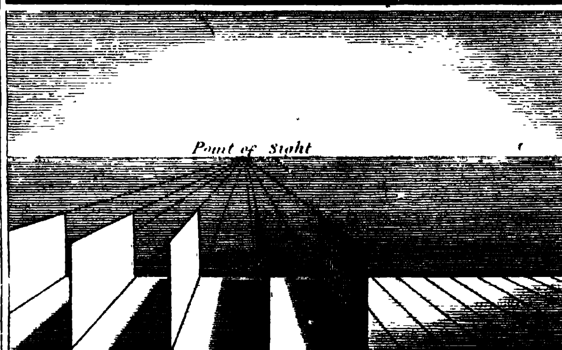


FIG. 2.

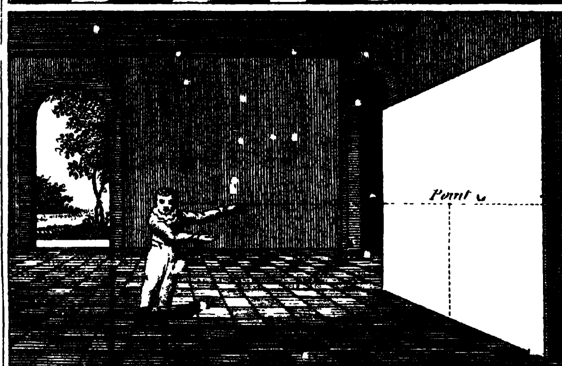


FIG. 3.

FIG. 4.

Section 5 Feet from the Eye

Horizon or real level

Turnbull Sc

Eliza. This is very clear, brother: now will you tell me the proper name of the *point* to which all their retiring edges would converge?

George. It is the *point of sight;* because the eye which could see the *five level planes,* just as they are drawn, must be exactly *opposite* that point.

Ann. Let me understand you clearly: Is this point to be considered as *in the picture,* and *on the distant horizon?* or is it placed there to represent the point which falls *directly opposite the eye* of one viewing the scene?

George. Suppose you go to the *transparent plane* (the window), and fix yourself steady, as if you would trace the scene before you—there would be *one point* of the glass you look through, exactly level with your eye; and the continuation of that *point,* by a *level line,* right and left, would be the proper horizontal line: but *this particular point* must fall precisely on that part of the line, where the ray, or direct line of sight, would form a *right angle* on the glass, or be exactly perpendicular from its surface to your eye; and the ray of sight, which is determined by *this point,* is called the *principal visual ray,* which you will be well acquainted with when you begin *to draw* in perspective; therefore, as this ray proceeds *from* the *eye,* and *not from the horizon* of the scene, the *point* thus marked must be considered the *point of the eye;* and it is only marked on the horizon, because it is impossible

to describe the real situation of the eye, as it must always be, *at least the length of the picture, transparent plane, or aperture,* distant from it.

John. I observe, brother, you sometimes say horizon; and at others, *horizontal line:* what is the difference?

George. All perspective representations *must* have a *horizontal line:* but there are many pictures wherein a view of the natural *horizon,* or utmost distance, cannot be expressed; such as *architectural views,* INTERIOR; caverns, woody scenery, and perspective descriptions of machinery; therefore the strict distinction is, that the *horizon* is the real object, and the *horizontal line* is a line drawn on the transparent plane level with it, and governs all the level objects in a picture; and, as I told you before, is determined by the height of the eye.

Eliza. It seems difficult to agree with one part of your law, that the horizon of *level land* should be drawn as high as my eye, when, in truth, it is no higher than my feet.

George. Your observation in this is very keen; and although you will still find the *horizontal line,* in the picture, as high as the laws of perspective have fixed it, yet I shall give you the satisfaction to know, that your *query* is founded in truth; and strange as it may seem to you, is consonant with the instruction I have given you.

Ann. Come, John, we must attend to this curious point: for if the ray of sight does really *descend* from one's eye to the distant horizon, I cannot conceive how brother can maintain his rule, of drawing the *horizontal* line *as high* as *the eye.*

George. The ray which conducts your sight down to the proposed point, is at the same time a conductor of the appearance of it up into your eye, and consequently in effect as high as your eye. Now suppose your eye to be five feet higher than the level where you stand, and you direct a ray of sight to three miles distant, towards the horizon of this level plain; now place, *or conceive, a transparent plane* of glass, to be set up for you to sketch the scene on—say three feet from you towards the horizon; then draw the horizontal line (on the glass or *transparent plane*) exactly where it seems to be on it—you must allow that is the true perspective situation of the *horizontal line* on this transparent plane; and how much is it below the level of your eye, think you?

Ann. It must be *somewhat lower.*

George. It is, as nearly as possible, the *eleventh part of the eighth of an inch* lower than your eye, when truly marked on the glass, at *three feet* distance from it: this is an atom in Eliza's favour; but too small to influence the rule laid down, *that of determining the horizontal line in a perspective drawing always as high as the eye;* and you

must observe, that it is the *distance* of the *transparent plane from your eye*, which occasions this space between the absolute level of your eye, and the *descending ray*: for were you to advance the transparent plane to the distance of one foot from your eye, the space between the real level, and the apparent horizon, would be reduced to the thirty-third part of the eighth of an inch; and agreeable to what I before observed, as the level ray and the descending one both *meet* in the eye, they will therein be of one and the same height. For the sake of giving you a *diagram* within the compass of our paper, I have reduced the distance from 3 miles to 36 yards, Plate V. Fig. 4, wherein you may see and prove, by mathematical demonstration, that an object 5 feet high, at only 36 yards distance, would be but 1 inch $\frac{5}{8}$ and $\frac{1}{3}$ in height, when traced on the section, or transparent plane, at 3 feet from the eye, and consequently but *that measure* from head to foot below the horizon. The two lines drawn on the tablet (which is represented on an easel by the figure) supposes the horizontal line, and the height of a line at 36 yards distance, according with the profile, to make the space of 1 inch $\frac{5}{8}$ and $\frac{1}{3}$ of an eighth between them.

John. We are sure now, that the horizon can never be *higher* than one's eye.

Ann. I thank you, brother. Now, before we proceed to further practice, I have one question to ask you

respecting the horizon: suppose you were as high on the mast of a ship as you could possibly be with safety, the sea perfectly calm, and your ship out of sight of land—would the horizontal lines all round appear to *you* as high as your eye, in the same manner as it has appeared to me at the Panorama?

George. Whether by sea or land, or whether one is on a hill, a mast, or a tower, the horizontal line will be so near the eye's height, as to admit of no deviation from the rule.

Eliza. Suppose, brother—Ann, I, and John, were to sit down at the window (see Frontispiece), and each of us to make a drawing of the scene before us; would not each drawing have its horizon according to the various heights of our eyes?

George. Yes, of course: if you will all take the position proposed, I will make a drawing of you and the scene together: the sun is going down very beautifully—it ought to be a pleasing picture.

John. Well, that is a pretty picture: but, brother, you have made the horizon higher than all our eyes.

George. You must agree, that I could not make three horizons in one picture, according to the rule I have taught you; and you must recollect, *I* made the drawing, and you know I *stood*, which brought the horizontal line just the height I have drawn it. You will do well to make fre-

quent application to true pictures, and to nature, to confirm all you learn.

Ann. I think we comprehend the theory of the *horizontal line:* what is the next consideration, brother?

The Theory continued.

George. Our next business will be to show John how he may draw an army of soldiers, marching in open column, as at a review.

John. I shall be glad to see you do it.

George. Now, sisters, look to the drawing (Plate V. Fig. 2), and remember the rule which it gives and explains, that all parallel planes, which go directly from you towards the horizon, *or parallel to the principal visual ray*, whether perpendicular (as those in the example), level, or oblique, *converge to the point of sight.* See the roof of Fig. 2. Plate VIII. for an *oblique* plane, subject to this rule; when, in geometrical fact, they are no nearer together, at their most distant parts, than they are at the *foreground.*

Eliza. What do you mean by *foreground,* brother?

George. It is that part within the picture, which approaches the *base line.*

John. But pray, Mr. George, where are the soldiers?

George. That is a very fair question, John; but I only

proposed showing you the perspective situation of the columns or rows.

Ann. And you have done it so plainly, that it only requires a little more of John's attention. Now, John, do observe, if these five parallel planes were so many ranks of soldiers, could any thing appear to keep better order, as soldiers march?

John. (*Ha! ha! ha!*) I knew it well enough, but I wanted brother to draw some soldiers; and I know all those lines on the ground are to represent *parallel boards,* although they all point to that *dot* in the horizon.

Eliza. You must not forget what that *dot* is called: if I have understood my brother rightly, it is that point in the picture which is exactly opposite the eye, and is called the *point of sight.*

Ann. Is there any rule, by which we may know on what part of the *horizontal line* this *point of sight* should be placed?

George. The best rule I can give is, to place it at, or near the centre of the horizon of the picture.

Eliza. Why, brother?

George. I have, from the beginning, endeavoured to fix on your minds, that a picture should be conceived the real objects it represents; and the frame, or boundary of the picture, a hole or an aperture, through which you obtain the view. If this idea impresses your minds properly, you

will reasonably conclude that near the centre of such aperture must be the most advantageous position of the eye; which, you now know, determines the point of sight opposite it, in the picture. Now carry on the supposition to the *covering the aperture with a glass;* and observe *very* attentively the advantage of *this situation* of the eye, and *point* of sight, when you begin to trace the scene before you. You consider, I presume, that your eye must be stationary as *to its place,* while tracing the scene; and would view the various objects before you as they fall under different angles from that point; therefore, the more right or left objects are from the *principal visual ray or perpendicular of your eye,* the more *askance* must the ray be to those objects; and, in tracing them on the *glass,* or *transparent plane,* as they would thus appear thereon, especially near the *foreground,* you would mark them *broader* than their proportionate size, *which will be made clear to you in* Plate X. Fig. 2: let this suffice to lead us on towards a complete knowledge of the *point of sight.*

John. I have heard you explain the ray of sight which goes from one's eye, *directly through the glass* or transparent *plane,* to the horizon, as the "*principal visual ray.*" This, I think, I understand, but I cannot see how a ray can be *perpendicular* to a picture, without you lay it on the floor, and look down *perpendicularly* over it.

George. I cannot expect you to apply all I have taught

you in one course of reading; but could you recollect the definition of a perpendicular line, in Plate II. Fig. D. No. 1, I should think you would not have asked this question; but, for the sake of confirming you in a thorough knowledge of this matter, I will make a drawing, and I have no fear of explaining it to your thorough comprehension. (Plate V. Fig. 3.)

John. Oh! I thank you, brother, for this drawing; why, it is like the large canvass which stands in the passage, and I suppose that little boy is me: there is the garden, too: do look at it, sisters—I hope we shall have some more drawings.

George. Now you must all attend to the *boy's eye*, and the *dotted line*, or ray, from it to the centre of the canvass; which *dotted line* is drawn to exhibit to your view the *principal visual ray*, as perpendicular to the picture; for it is to be understood to be at a right angle to the surface of the canvass on all sides; and was the picture, or canvass, to be laid down on the floor, as John proposed, and that ray was a substance of straight wire, properly fixed, it would then be as perpendicular as a plumb-line: therefore, place the surface of the canvass in whatever direction you choose, the wire would retain its relative perpendicular to it; and any eye directed along this *ray* (of wire) must, according to the perspective acceptation of the term, be perpendicular to the canvass whereon it is thus fixed.

Eliza. Will you show us how you made the pavement in this drawing look so square; as they decrease in width and length—by some regular rule, I have no doubt?

On the Point of Distance.

George. This question brings the *point of distance* under our attentive consideration, which is *the distance of the eye from* the transparent plane through which you see the objects of your study, and on which you would mark or trace them, as seen thereon; were it not for the *geometrical means* you are now attaining, to produce precisely the same effect; for although we do not absolutely trace on the glass, from a given point of distance for the eye, we are under the necessity of introducing a *section line,* to answer all the purposes of the glass, in order to obtain the true perspective measurements of the objects; and the *distance* of the eye from *this line,* or substitute of the surface of the picture, glass, or transparent plane, always means one and the same thing, and constitutes the *point of distance.*

Ann. I take it very kind that you so often repeat the words "*or transparent plane,*" whenever you have occasion to treat of the surface of the picture; but don't you remember, brother, we all caught the right idea, at the very first, when you called John to the window to trace

the view on it (see Introduction)?—You need only say *picture* in future.

Eliza. And leave our "mind's eyes" to see the rest.

George. I thank you, ladies, for your good-nature, attention, and wit.

John. Come, brother, show us what is to be done with this *point of distance.*

George. It is always to be marked on the horizontal line, on the right or left, or both, of the *point of sight,* exactly the measured distance of the eye from the picture. Now, Ann, you shall make the drawing, Plate VI. Fig. 1.

Ann. I have some *parallelograms* ready drawn.

George. First draw the horizontal line, *ad libitum* as to height, and above twice the length of the picture: take care that it be parallel to the base line. Now find the *centre* of the picture, and mark it on the horizontal line, as the *point of sight*; then take the length of the picture with the dividers, for the *distance* of your eye from it, and set one foot of the dividers on the point of sight, and the other will mark the *point of distance* on the horizontal line; next draw a perpendicular line from the *point of sight* to the base line; now open your dividers any width you choose; for *half* the width of a square of pavements, set one leg on the centre of the base line, and mark the points on each side of it with the dividers: then draw lines from them to the point of sight, which determine the width of

the pavement. Now draw a line obliquely, from the *point of distance* to the opposite side of the pavement, terminating at that and the base line: observe where it crosses the left line of the pavement—*that is the point* which determines the depth of the first square; thus, you have only to draw a horizontal line from it to the opposite line of the pavement.

Eliza. Oh, this is delightful! let me draw one square.

George. Only draw an oblique line from the *point of distance* to the same side Ann did, and down to the top of her square, and rule the horizontal line; now we have two squares; come, John, you do the third.

John. That is soon done; but I wish to see as many as are on the chess board—then we should know how to draw a whole floor.

George. It is my intention, and *I* will draw it to teach you to handle the instruments in a better manner than you do. Now attend: I shall first draw the representation of the whole side of the chess board, Plate VI. Fig. 2, as one large square seen in perspective, by the same process. Sister Ann found the perspective of one square of pavement; then I shall divide it, at the base line, into eight equal parts, and draw lines from them to the centre, or point of sight: these divisions will cross the oblique line which I first drew, to find the whole square, exactly where the horizontal divisions of the board must be drawn.

John. I see this comes like all perspective; but I wish you could draw them to appear *quite square*, as the real object does when I am not thinking on perspective: this drawing *appears* to diminish; and the furthest divisions *look really smaller* than the *nearest*.

George. My dear ingenious boy, I hope I shall clear this very reasonable query. Perhaps one reason why the drawing does not give a more true effect may be, that these sort of lessons are drawn with too little attention to the gradual diminution of the lines, as they recede from the base line; but the chief reason is, that the utmost perfection perspective can give to a picture, is only to convey the true idea of a scene or object, when viewed at the *very point* of distance the artist determined his picture by. The examples I have given you are *small*, and the *point of distance* proportionate to them: if you can bring your eye to that distance, you will find the effect you wish. Now, for experiment's sake, open the dividers the length of the distance, that is, the space between the point of sight and the point of distance; keep one foot on the point of sight of Plate VI. Fig. 2; raise the other as near as you can, perpendicular over the point of sight; then bring your eye carefully to the *raised* point of the dividers, so as not to hurt your eye; and look stedfastly on the drawing for a few seconds, and you will find the true effect is properly produced.

John. Indeed, sisters, you must try this experiment, for the whole board looks really square, just as I meant: mind to keep your eye perpendicular to the point of sight.

Ann. I confess I felt the same objection John made, till we had this experimental proof; which is so clear that I think I could give another example.

Eliza. Pray, Ann, treat us with one of your best.

George. I see Ann is prepared.

Ann. It is certain, when I look upon any object, that *my eye* is at the *only* point it could possibly see it in that particular shape; and were I to draw it while viewed from that point and distance, ever so perfect in all respects, I think that no one, who was not determined to be deceived, could suppose the drawing the real object; except while viewing it exactly in the same light, shade, and distance, the object was in when drawn. Now, only lay the dictionary on the table, and as we sit in two different directions from it, were we to make each a drawing of it, and then exchange drawings, without at the same time, changing places, it would be impossible to compare them with the original, and more so to suppose either could be taken for the *real book*.

Eliza. I am very much obliged to you, sister. Now I wish to ask George, why the *length* of a picture is fixed on as the proper distance of the eye from it?

George. It is the SHORTEST distance allowable, because

the eye is so formed, that, *were* it to take a nearer point, it could not perceive, at one view, all the objects right and left, above and below the *point of sight of the* picture, under a proper angle for *description* or *delineation,* on the *transparent plane* ; as before observed by the word *askance,* when I was treating on the *proper situation* of the point of sight. You may prove this by reference to our common experiment: *go to the window,* and take one square as a picture, and place your eye at the *proper* distance, you will then prove the rule to be good; because all detached views of nature are done on *flat surfaces;* and the laws of perspective require the *transparent plane* (on which the outline must fall, as the visual ray passes from the eye to the object) to be at that proper distance from the eye, that its longest measure may be comprehended within an angle of *not greater* than about 51½ degrees of a circle (of which the eye would be the centre), which is about the length of the picture. Fig. 2. Plate X. will in due order explain this point to your satisfaction.

Ann. I perceive the great importance of taking a proper distance; and if I comprehend what has past, I think the point we take to *paint a picture* must be the best *point to view it from.*

George. You are perfectly right, sister; and I expect this subject will afford you some mirth before we quit it.

Eliza. Then, I suppose, it is contrary to the laws of

perspective for one to go from side to side of a room to view a picture, since *that point of distance*, which the painter performed his work by, is determined to be the best?

George. Most assuredly it is, when the light falls properly on the picture; but, unfortunately! many very fine paintings are hung so disadvantageously, that the glittering of the varnish, or glass, is all one can see at the true mechanical point; this obliges one to take some indirect position to avoid the glare; and without some such good reason, you may rely on the "*rule in perspective*" as an unerring guide, always taking a perpendicular position, and move forward or backward till you find you are at the *painter's distance*; and this is a duty you owe the artist before you are qualified to criticise the *perspective* of his picture, *especially* of circular planes.

John. Will you please to tell me why pictures of circular planes require to be viewed from the proper point more than the representation of any other object? and at the same time tell me what are circular *planes*?

George. Circular planes are circles described on a flat surface, as a circular waiter, a coach ring, a wheel, the top of a saucer, cup, or glass, the section of a column, &c. &c.; which will not only appear very unpleasing, but incorrect, when seen in a picture from any point except the true point of sight and distance. Perhaps the *direct*

front view of St. Peter's at Rome, of which there are engravings with the circular colonnades, is one of the best specimens you can prove this by; for on viewing this picture askance the whole scene is distorted.

Ann. I thank you, brother; this explanation has solved a matter which has puzzled me ever since we were last at the theatre. You know we sat *on one side*, near the stage, and the scenery and side wings appeared so badly arranged to what they were before, when we sat in *that box which is behind the pit*: then they all united so surprisingly natural, that I wondered at the ingenuity of the contrivance: this was owing to my being much nearer to the *painter's point* at one time than at the other; was it not?

George. Your observation has been very correct, and it is extremely cheering to me to find myself so well understood; for when you sat in the *front box*, you were *on an exact level with the horizontal line* of the scenes, and at *the very point of distance* the artist drew them by, or *should* have drawn them by, which governs the perspective associations of the stage, scenes, and side wings.

Eliza. I did not make the remark, Ann did, but I could not discover that the stage was unlevel till we sat *last* in the *side* box.

George. The *stage* is made to have a *due inclination* towards the *horizontal line*, as are the *side wings* to the *point of sight*, governed by the distance of an eye in the

centre of the front box; where the deception or stage effect is the greatest, and the converging inclination the least perceivable. Suppose a theatre to be eighty feet long from the front of the boxes to the utmost extent of the stage, then allow forty feet for the pit, and there will remain forty for the stage; but should it be required to make the stage appear 100 feet long, see Fig. 3. Plate VI. a profile: draw a level line 140 feet long (by *a scale suited to the extent of your paper*); then make a mark at forty feet for the length of the pit, and a perpendicular mark at forty feet from the front of the stage, which is the *real* length of it; then suppose an *eye* in the front box about four feet above the level line first made, and draw a ray from it down to the end of the 140 feet line; and where it crosses the perpendicular, which you marked to represent the real extent of the house, is the point to which the back of the stage must be raised, and it will correspond with the proper horizontal line, and produce the effect.

John. Upon my word he must have been a clever fellow who *first contrived all* these things.

To Sketch from Nature.

Ann. I want to know if I might sketch *a large extent* of prospect on a leaf of my *little sketch book?*

George. You may sketch an extensive view on paper of any size, by due regard to proportion. Perhaps there cannot be a more certain method of finding how much your paper will probably contain, at one view, than by holding up the edge of it horizontally, at about its length distant from your eye; then quickly and carefully mark the top with your pencil, in contact with each of the principal objects, observing, after you have marked the situation of the most conspicuous, to keep its mark directly to it, when you mark the others. When you have taken enough of these memorandums, you may begin your drawing, looking to the touch at the top of your paper for the situation of the object under it: you may use this same method for the heights of objects, by fixing an object on the ground for the height of your base line: then bring the bottom edge of your paper to that, and mark *heights* on the *side* edges of it, taking great care to abide by the point you determine to be the bottom line of the drawing, and the same distance you first held the paper at.

Eliza. This I understand; but how should I proceed, were I desirous of taking into my picture a *certain object* on *the right hand*, and some other picturesque matter on the left, and, on holding up my paper at the proper distance, should find it too short to include all I would draw?

George. If it is practicable, you may obtain your wish

by *taking a greater distance* to view the scene; especially if those two extreme objects you wish most particularly to include, are near the foreground of your picture: as thus, suppose them two hundred yards asunder, you will then find, at two hundred yards distance, that *your paper would include the whole scene*, if held up exactly its length distant from your eye; but taking this only as an answer to your question, I must not confine you too closely to rule in this particular. *The rule is the standard,* and should never be lost sight of: yet there are beauties in picturesque nature which perhaps would be lost to the port-folios of the landscape painter, if he confined his labours too strictly to rule: genius must ever be one of the council. Plate VI. Fig. 4. will show you the proportionate increase of extent which may be seen through an aperture of one foot square at equal distances. I have placed them about three feet apart, instead of one foot, which is the proper distance, that each surface might be seen clear of another in the drawing. The eye is there represented as looking through No. 1, the square aperture; and the surface, No 2, shows you that the eye can see a surface twice the length and breadth of the aperture, at twice its distance; and three times each way, at three times the distance; and four times four, at the fourth distance; and so on, in the same progressive proportion.

John. Then I think I can tell how large a space might

be seen through the one feet *aperture* at 9 times the given distance from the eye.

Ann and *Eliza*. How can you tell?

John. Nine times nine is *eighty-one;* is it not, brother? then that would be a surface of eighty-one feet.

George. You see, sisters, that boys do not learn their multiplication table for nothing: you both know it as perfect as he does, but practice has enabled him to apply his knowledge a little quicker than you: it only required your cool attention to what I had just said, to have had no doubt of John's making the answer he has. Keep your mind clear, and do not fancy any thing more *deep* or *intricate* than it really is.

An Angular View.

Ann. I now want to know how to draw the chess board, in perspective, when viewed with one corner or angle of it nearest my eye, instead of the side?

George. I have one drawn, Plate VII. Fig. 1.—Now I beg you will begin attentively, and endeavour to explain the manner of drawing it.

Ann. I should first draw the *base line*, then the *horizontal line*, and mark the *point of sight* about the centre of the horizon; and draw a perpendicular line from it to

the base, to mark the hithermost corner of the board ; then I should mark the *point of distance* on the *horizon*, equally, on each side the *point of sight*; then I see you divide the base line into sixteen equal parts, eight on each side the centre, and draw lines from each to the point of sight; then draw the two oblique lines from the *point of distance* to the *centre point on the base line*; this, I perceive, forms the two nearest sides, and the hithermost angle of the chess board; then I have only to draw lines from all the points, where the sixteen equal divisions cross the two oblique sides, to the opposite points of distance, and the outline is done.

George. Those points, which you called the *points of distance*, are properly called *vanishing points* (see page 78, last line but 2, and Plate XII.); and the distance of the eye from the picture will not determine their situation, except in a direct diagonal view of an object: in all others, one point will be further from the *point of sight*, and the other nearer, according to the angle you view it under.

On Foreshortening, and Anamorphosis.

Eliza. Now, George, will you give us a clear idea of the *technical term, foreshorten*, or *foreshortening?*

George. The word *perspective* is a general explanation

of the term; because the effect of all surfaces, except those whose sides are directly opposite to the eye, are produced in the picture by *foreshortening*. Observe the *five parallel planes* in Plate V. Fig. 2: those two which are nearest the centre of the picture, are the most foreshortened: the edge of one of them is nearly opposite the eye; yet foreshortened as it is, I believe you have never doubted its being a tolerably just representation of a surface of equal size with the other four. The regular diminution of the chess board, Plate VI. Fig 2, as it recedes from the eye, is *foreshortening*; but the term is most particularly applied to such figures as are more distinguishable by their *length*, than their *breadth* or *thickness*; as the limbs of the human figure represented *endways*, or pointing out of the picture towards the eye of the spectator. Foreshortening the limbs of the human figure should be as much avoided as possible, especially in single figures, for they seldom produce an agreeable effect, even when drawn with the utmost skill: yet there is a picture which has obtained the title of "*Miraculous!*" from the skilful management of the foreshortening of a figure in it; and there is a picture by one of the Dutch masters, of a man presenting a gun directly to one's eye, which excites the idea of "*Beware!*" yet you see only the muzzle of the gun. There is also a very pretty Cupid, by Cosway, drawing an arrow to the head, pointing directly towards one, entitled "*Beware!*"

The arrow and the barrel of the gun are, in the painter's phrase, *foreshortened:* genius and judgment must govern this point; because it will be not only sometimes unavoidable, but absolutely necessary, to that variety of character and expression, which must naturally occur in groupes.

Ann. Then if I lay a print, or drawing, *flat* on the table, to copy it, I must view it *foreshortened*, which would be an imperfect representation?

George. You are right, sister; this thoughtless or ignorant habit, with many who attempt to copy a print, or drawing, thus laid before them, arises from copying, by writing, where it matters little how they place the original, so they can but read it: in the same manner they think they can copy a picture, if they can but obtain a glance, so as to *conceive* they see the object before them—I say "*conceive,*" because, unless it is placed as *all pictures should be*, according to the rules I have already given you, they must depend on a thorough knowledge of design, and copy rather what they *know* to be in the picture, than what they could possibly see while in an indirect point of view.—Now, John, tell me how long the twelve-inch rule appears to your eye, as you see it *endways* to you, where you sit? (Plate VII. Fig. 2.)

John. I think it appears *twelve inches* long.

George. And I will presently prove, that it only ap-

pears about *three inches* long to you. Come, sit still, and shut one eye; now, mark with the pen (carefully) the shape of the rule on this glass which I hold up;—there you see it is, as I told you, about three inches long.

John. That is very surprising! why, I drew the whole length of the rule, and you know it *is* 12 inches. Must it be so short as I have traced it on the glass, were I to sit down here to paint a picture of it without tracing?

George. Most assuredly; because perspective (generally speaking) requires you to draw things as they *appear;* and this tracing of the rule on the *transparent plane of glass,* is a general outline of its *appearance,* at the point you viewed it.

Eliza. It is clear to me now, having this perspective drawing of the *twelve-inch rule* on the glass, that there can be no position proper for me to set it in for copying, but that wherein the *principal visual ray* of my eye would be a perpendicular line to the surface, as it was to the glass on which the original was traced.

John. Why, sister?

Eliza. Because the perspective representation has already reduced twelve inches to three; and were you to lay the drawing on the table, where the rule is, and copy truly what would then really appear to your eye, I suppose this second drawing would only be about *three-quarters* of an inch long!

Ann. This would be *foreshortening foreshortening!*— Oh, I am so convinced of the absurdity of viewing it thus, that I fear I should show symptoms of *ridicule* if I were to see any one copying a drawing set before them in *any indirect position,* and it is but fair to begin with myself. I must laugh when I recollect how I have placed some of the things I have attempted to copy.

John. But, sisters, how is it then that I have taken copies, which you all have praised, from drawings laid flat on the table?

George. Do not you recollect that you often took up the original, to have a *direct view* of it, as you proceeded?

John. Oh yes! I did.

George. *It was thus* that you learnt what you had to do; for had you never seen the original in any but the oblique view you had of it when laid flat on the table, you would never have earned the praise you received.

John. I thank you, brother; I now see the necessity of taking the same point to copy a picture, as one ought to take to criticise it.

Eliza. 'Twill be good fun to see persons twisting and turning pictures about in all directions, saying, "Now I have it completely," when the picture is in such a position as to represent only an *anamorphosis.*

Ann. And to see the *connoisseurs* pulling one another

to various positions, thus, "Do but come here, I have it to perfection!" Ha! ha! ha!

George. This is the mirth I promised you; it is the well-earned joy of intellectual information; yet we must not suffer vanity to grow up with our knowledge, but patiently teach those who desire to learn, and suffer the lazy and "*will-governed*" ignorant to pass on in their errors.

John. Pray, brother, will you explain the meaning of the word Eliza made use of just now; I should have looked in the Dictionary, but having never heard it before, I could not spell it correctly enough to find it.

George. "*Anamorphosis*" was the word, I believe—it is a sort of drawing which, to direct the view, represents a monstrous deformity, entirely unintelligible; but when seen in one certain direction, or viewed in a cylindrical mirror, appears regular and in due proportion: "there are several of these curious pieces in the Ashmolean Museum, at Oxford;" and I think Eliza made a very proper use of the word.

John. Can I see an anamorphosis any where?

George. Yes, in the Encyclopedia.—What are you smiling at, Ann?

Ann. An expression of your's—when you were very young, you saw some incorrect pictures, and Father has *told me* you gave him a smile of gratitude for the early information he had given you, and said to him, "*What a fine*

thing knowledge is!" I am now in a similar mood, enjoying the knowledge you have given us.

George. May I conclude, then, that you are perfect in the progress we have made?

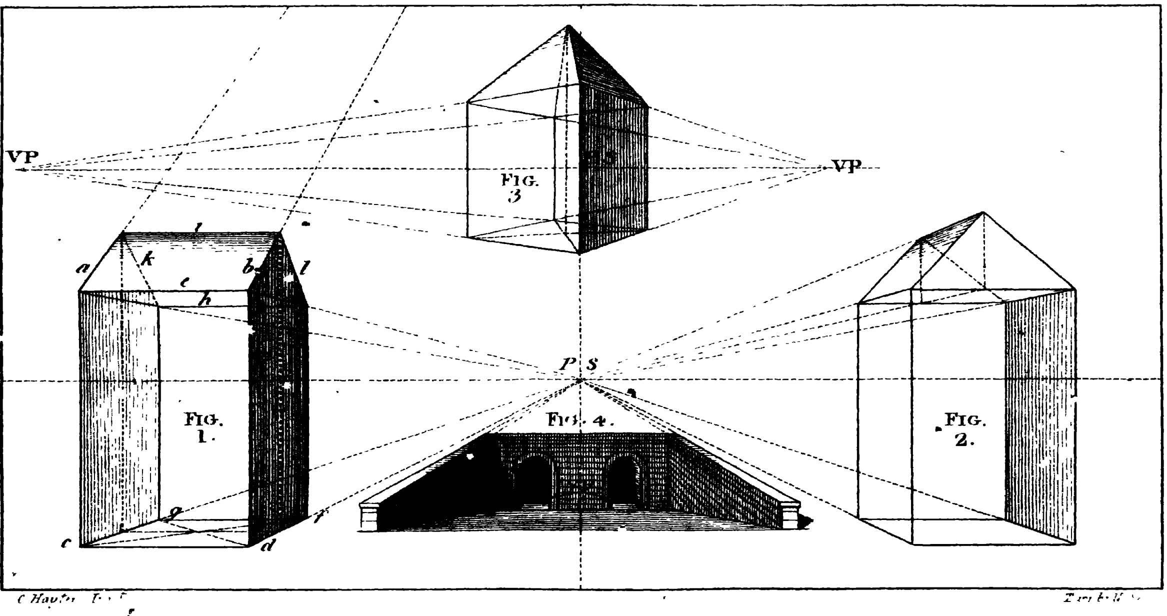
Ann. I think, with the assistance of my *drawings* and *notes,* I could perform, and understand, all that you have taught us. But I expected you to say more in explanation of *vanishing* points, when Eliza introduced the subject of *foreshortening,* which being equally interesting to me, prevented my interruption till you had *so completely* explained it; and I now shall be glad of your further assistance, to enable me to take a clear view of the *vanishing* points.



On the Vanishing Points.

George. They are those points in a picture towards which all *lines* and *planes* which are parallel to one another, converge; the *points of sight* in Plates V. and VI. are the vanishing points of the level, and parallel objects in them; but the distinguishing application of the term *vanishing point,* belongs to such converging points of parallel lines and planes, as (from their oblique position to the eye) fall on some remote part of the horizontal line.

PLATE VIII.



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Eliza. Do all vanishing points fall on the *horizontal line?*

George. Yes, of all *level* parallels, such as the chess-board, the pavement, and the shelves; but the converging point of *unlevel* parallels, which are called *inclined* planes, (see Plate VIII. Fig. 1, and page 59, line 14) must fall above, or below the horizon, according to the obliquity of such parallel: their vanishing points are called *accidental points.*

Ann. Will you show us an example or two, to make us understand these distinctions?

George. Plate VIII. will show you such objects, as have some of their sides in such directions, as to have their parallels converge to vanishing points, not on the horizontal line. The roof of Fig. 1. is formed of two *inclined planes,* and the vanishing point of the sides *a* and *b* must ascend far above the horizontal line; but although I do not deem it necessary to follow the method which Kerby attributes to Dr. Brook Taylor, in finding those points, yet at some leisure opportunity I hope you will make yourselves acquainted with the scientific and ingenious discoveries of that learned mathematician on this subject.

Ann. Is the method you have taken, better than the one you allude to?

George. I find it *as* scientific, and *much* easier to beginners; and producing the same effect, I consider it preferable; for many of the methods already extant, ap-

pear to be scientific confirmations of truth, rather than the readiest means of attaining it.

Eliza. Come, then, show us how to draw the roof of the first *figure*.

John. Why do you call a *house*, a *figure*?

Ann. Illustrations, by these sort of designs, are generally termed *figures*.

George. Now attend, and apply to the figure at every reference, while I teach you how to draw it: as it is only to illustrate the method of finding the *points of the roof*, I have not *made* any scale of dimensions. First (after having drawn the parallelogram as a boundary line to your picture), draw the horizontal line, and mark the point of sight near the centre; then draw the line *c d* a convenient length, to form a figure on, *level*, and near the base line of the picture; let it be sufficiently to the left hand of the point of sight, to show the inclination of the roof at the end *d*.—(This end, and its opposite, and all such, are called, by builders, "*gable ends*.")—Now raise perpendiculars from *c* and *d*, of equal length, a convenient height above the horizon; then draw the line *e*, which forms the bottom of the roof; next draw the four rays, from the four angles of the figure you have drawn, to the point of sight; then draw that level line, which forms the furthermost side of the figure, at a convenient distance (as no *particular depth* of the building is required from *c d*), as in the example, from *g* to *f*; from *g* and *f* raise perpendiculars,

till they touch the two top rays, and there draw the level line, which forms the opposite side of the bottom of the roof: thus you have the perspective lines of a cube, to which we only require a roof. Now draw lines from *c* to *f*, and from *d* to *g*, and where they cross is the central perspective point of the figure; draw a level line across this point till it touches the two bottom rays, which go from *c* and *d* to the point of sight; then draw perpendiculars from these points, to a proper height, for your roof; draw, then, the inclined line *b*, to any angle you please; then draw the ridge level, as *i*: this produces the termination for the line *a*, and its opposites, *k* and *l*—and the figure is done.

Eliza. What are those two dotted lines, which ascend from the lines *a* and *b* of the roof?

George. They ascend till they meet and form the *vanishing point* of the *inclined* plane, of which the lines *a* and *b* are the two edges; and it is herein, I conceive the method I have explained to be the least difficult; because the proper points of the figure being found, produce this vanishing point as a result, *sooner than* it could be as *the means*; therefore I shall abide by this method, throughout our course of conversations on this subject.

Ann. This is very satisfactory, brother: now, show us how to draw Fig. 2.

George. You will produce the whole (*below the roof*)

exactly by the process used in drawing Fig. 1. (which you may take as a general rule for drawing the perspective view of a cube, when you are not confined to any particular scale of measurement): then divide the top line of the hithermost side of the *cube* in half, and raise there a perpendicular, as high as you intend the roof to be; from the bottom, and top of which, draw rays to the point of sight; and by raising another perpendicular, on the furthermost side of the top of the *cube*, at the ray which divides it in half, till it touches that ray which forms the ridge of the figure, you will have found the points where the inclined planes, which form the roof, terminate; and their ascending sides will be parallel. Fig. 3, shows you how to draw a cube seen on one angle, where the vanishing points are not the same length from the point of sight, as the distance of the eye from the picture; and to make the point of a roof, or spire—find the centre, according to the method used in Fig. 1, and page 59, line 14, and raise a perpendicular the height you require, and draw lines to the top from the three apparent angles.

John. I think you should have shown us these things before you taught us to draw cottages, and roofed buildings, for I begin to think all I have drawn must be very much out of perspective.

George. Your study, hitherto, has been rather to bring you to the right method of using a pencil, and to learn to

distinguish a perpendicular from a level, and a circle from an oval; or a right angle from an acute, or obtuse one, by the means of sight and practice, in order to obtain a correct *eye*, and *hand, from the study of others:* but now, as you are improving, it is proper you should know the causes of the effects you produce, and form a critical judgment of whatever you take in hand.

Eliza. What are we to learn from Fig. 4.?

George. As Plate VIII. is on the subject of inclined planes, and the converging or vanishing points of their parallel sides, I have thought it proper to give you one example of an inclination of the plane, receding downwards, directly before you, as a "down-hill" effect, towards the arched entrances. The vanishing point in this figure, as in the roofs of 1 and 2, is produced by the meeting of the lines of the two sides of the inclined plane, and consequently arises out of the process of drawing the figure, which saves you the trouble of searching for this point, (as a *necessary* means of performing the work).

Eliza. And I feel no doubt of its being quite sufficient to enable us to draw any inclined figure.

George. You have, by these simple maxims, "*competency*;" but the "*riches*" of mathematics and geometry, like gold, require incessant searching after. I would not, on any consideration, hint at a wish to prevent your acquiring full information of all that has been produced on

the subject, by the most learned authors, had you the means: but a more extended knowledge of mathematics, than you may ever find time, or perhaps inclination to possess, is absolutely requisite to the pursuit.

Ann. Since you mention "gold," pray are we not to learn how to draw guineas in perspective? as, perhaps, when I am improved in the art of design, I may wish to paint a subject similar to that at Windsor Castle, of misers counting their riches: excuse my mirth—how are we to put circles in perspective?

The Perspective of a Circle.

George. A circle seen in perspective, is a regular *ellipsis*; therefore you have only to find the perspective view of a square, in which the circle is described, as any one of the squares of the chess-board (Plate VI.), and describe an ellipsis therein, according to the method which the "Jesuit" attributes to *Serlio*, which I have given (in Plate IX.), with an additional example of a circle on the same range, but not directly under the point of sight. (See Fig. 1. G. and H.)

Eliza. Pray, brother, how are we to proceed?

George. I hope the example is sufficiently clear to direct

PLATE IX.

Fig. 1.

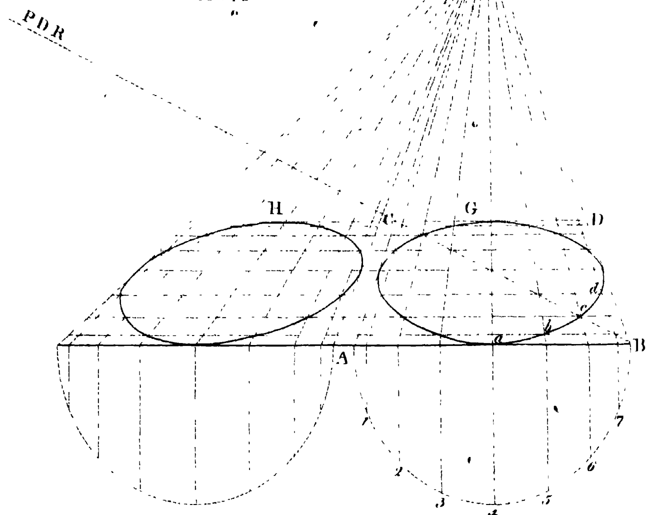
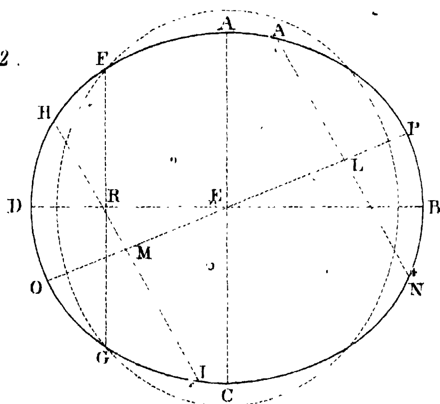


Fig. 2.



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you in that. Take courage and begin, and I cannot doubt but you will accomplish it.

Eliza. I shall begin with that which is marked G, as I find its *apparent* square part is produced exactly as Plate VI. Fig. 1, and explained in pages 39 and 40.

George. Then leave a small space between G and H, and set off the same width for H as the figure G, which you have drawn; and carry the ray to the same point of sight E; the depth inward is determined by the depth inward of G: this completes two squares in perspective, within which you are to describe the perspective lines of the two circles by the process laid down in your example.

Eliza. I perceive I must draw a half circle under each square, and divide them into eight equal parts; and then draw perpendicular lines from each division till they touch the line A B, and from them to the point E. I find the same divisions are repeated, *across* those I have drawn to the point of sight, in which I am governed by the diagonal ray P D R, which I first drew from the point of distance, to find the depth of the whole square. Now I have only the circles to draw, which I see pass through those angles which you have marked *a b c d*, &c. which will easily direct me to the end of the operation; as I understand, I have only to repeat the same on the other square, which is marked H.

George. I thank you, sister; I hope your success in this

will encourage you to venture on other problems: for, if you attend to the directions which must *of course* accompany them, the vast number of lines which at a general view appear confusing, will lose that effect as you proceed; and the principles will be unfolded to your mind much more forcibly, than when you have a master by your side, to help you over every difficult passage.

Ann. Are circles in perspective perfectly elliptical?

George. Yes: although it has been questioned by some, but you may prove it by a simple experiment; that of drawing a circle in perspective in any aspect, and doubling it outwards correctly in half; when on holding it up to the light you will see the two *semi-ellipses* to tally, so as to appear but one; or you may mark a number of pin-holes through the one side on the elliptical line, and unfold it, when you will find that they have passed through the other half. For *this* experiment, you must find its two *extreme* diameters, that it may be properly folded; as no view of a circle in perspective, except a *direct one* (as in the example G), will give the long diameter level.

Ann. Please to show us how *this* is to be done?

George. Brother John has copied the fourteenth proposition of Le Clerc's second book of Practical Geometry, on purpose: come, John, explain the process to your sister. (Plate IX. Fig. 2.)

John. The ellipsis is marked by the letters A A B C

D, and you draw (at pleasure) the two parallel lines, A N, and H I; then bisect those two lines, which produces the points L and M, through which you draw the line P L M O; bisect it at E, which is the *centre* of the oval; upon this point describe a circle (at pleasure), only observe that it is greater than the shortest diameter of the oval, and less than the longest, that it may *cut* the oval; then through the intersections F and G, draw the right line F G; bisect it in R; then you can draw the greatest diameter B D through R E, and the lesser through E, parallel to F G.

Eliza. I see *bisecting* a line, is dividing it in half: you had not taught us this, George?

George. Had you studied Le Clerc, or Nattes, *as I told you*, sister, you would have been well acquainted with the term. You will proceed with difficulty if you do not make yourself acquainted with practical geometry: the authors I have recommended will answer the desired effect.

Practical Perspective.

George. Now, Eliza, we can proceed to what you termed *prophetic*, in perspective, by drawing various objects to measurement, as they would appear if seen from a given point of angle, *height*, and distance. Our first essay shall be the perspective view of a level walk, which

may represent the appearance of 20 yards long, and 4 yards wide, on the sides of which I will place six square posts, each one yard high, and 9 inches square, at equal distances from each other. (Plate X. Fig. 1.) I suppose I need not repeat the method of proceeding?

Ann. No, brother: I will undertake to prove to you that I understand the process, if you will please to remark any mistake I may make.

George. I shall be very happy to attend to you: but let me advise you (as a general rule) to draw it considerably larger than the example—and permit me to remark, that (by due application to your *scale*), the rules you will receive for drawing this problem, will serve to guide you in taking a perspective view of all such geometrical objects as are perpendicular, level, and parallel; as streets, squares, walks, roads, rooms, &c. by applying their geometrical dimensions properly. For suppose all the *posts* were immense obelisks or towers, and their distances, asunder, bearing the same proportion they do in the example, the drawing might be precisely what it is; but, most probably, and more properly, they would rise far above the horizontal line. And after you have made yourselves thoroughly acquainted with Plate XII. it will only be necessary for you to repeat the knowledge you will have then acquired, by drawing a few different subjects, such as come properly under the laws of our present problem, or the

PLATE X.

FIG. 1.

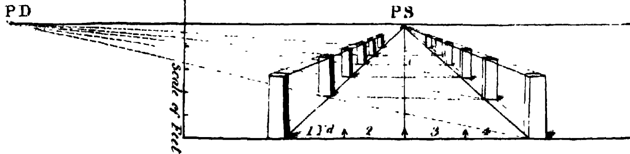


FIG. 2.

Page 70. line 7.

Base Line of the Elevation

Ground Plan of the Columns

Section Line or Edge of the Transparent Plane

Rays of Sight

To Mathematicians.
This problem is a Subject of very Ingenious consideration by Kirby, Book 1st page 94 Pl XIV. Fig. 5. On the reasonableness of which the Author of this rests his present conclusions.

whole of Plate XII. and you will find yourselves enabled to draw geometrical objects in any similar direction.

Ann. I will draw it on this half-sheet of foolscap: I shall first draw the size of the picture, or *plane,* not more than two-thirds the length of the paper, that I may have room to mark the *point of distance* at the proper place, on the horizontal line; and the width proportionate to the original, is about 3 by 2; then I divide the height of my drawing into three, and give the one-third from the base line for the height of the horizontal line, which I shall next draw; this space I see you have divided into five equal parts: I understand each division is to be considered as one foot, which forms a scale for the measurement of the rest of the work.

Eliza. Why do you determine the horizontal line to be five feet high, brother?

George. Because it is near the height of a man's eye, and being a whole number, is better adapted as a rule than 5 feet 6 inches, which might be rather nearer the height of the eye of a tall man: go on, Ann.

Ann. I now draw the *horizontal line, the whole length of my paper,* and mark the point of sight on the centre of the picture: then with the dividers opened to the *length of the picture,* placing one foot of them on the point of sight, and touching the horizontal line with the other, I find and mark the *point of distance.*

John. Why do you draw the horizontal line so much longer than the picture?

Ann. That I might mark the point of distance on it: have you, so soon, forgot how we found the first squares of the pavement? (See Plate VI. Fig. 1.)

George. Very good, indeed, sister!—proceed.

Ann. I believe I must next draw a perpendicular line, from the point of sight to the base line, and then mark *two yards,* on each side the centre, on the *base line,* for the width of the walk.

Eliza. Pray, sister, how will you determine this measure?

Ann. Observe the height of the horizon; that is determined to be 5 feet; therefore I take three of those divisions to make 1 yard: is that correct, George?

George. Certainly.

Eliza. I feel I must have been forgetful of what you explained respecting the *little scale rule,* in the case of instruments; but I am very glad I have inquired, as it helps to confirm the knowledge of drawing *proportionate* to a real object.—Excuse the interruption.

Ann. I shall now decide the width of the walk, by drawing lines from the point of sight to the *determined* width on the base line; then, as there are to be six posts, there will of course be five intermediate spaces, of four yards each (except the 9 inches for the size of the post, which I see begins on the base line of each division of

posts), and are found exactly as we did the square pavement (Plate VI.); and by repeating it five times from the base towards the horizon, I produce the perspective length of twenty yards, with the addition only of 9 inches beyond the furthermost post.

John. And how will you do them?

Ann. I shall first mark the space of 9 inches at the base, on the outsides of the walk, and draw lines from those marks to the point of sight: this gives the width of the posts, their *depth* inward being exactly the same as their *width.* The ground plan of each post I find, as I did that of the *larger square;* from which I must draw all the *visible* perpendiculars, or angles, of the posts, their heights being determined by drawing those perpendiculars which arise from the two *first posts on the base line, three feet in height* (by my scale), and rule lines from these to the point of sight: this will mark the proper height of the rest.

George. My dear Ann, your progress delights me! I hope I shall not grow vain as a preceptor.

Eliza. Indeed, brother, you have a right to the pleasure this gives you: pray call it by a better name than vanity. As this drawing has proceeded, I observe it must invariably happen for objects to *diminish* in appearance, according to their *distance* from the eye; and yet I find,

that when *a row of columns or posts*, &c. are drawn *fronting the eye*, and their bases are *parallel to the base line*, they appear in many pictures to be given *all of one dimension*, whatever may be their various distances from the eye. —Will you please to explain this matter to us?

George. Were you to trace a direct front view of a portico, or row of columns (Plate X. Fig. 2.), exactly as viewed from a fixed *short* point of distance, you would find those nearest the centre would *mark the narrowest*, and those to right and left, although further from the eye, would (from their oblique *point of view*) *mark broader* than their apparent diameters, if viewed through, and traced on, a glass *directly fronting them. This has raised some objection to the strict adherence to the laws of perspective*, when such an object of imitation falls under *so great an* angle; because, notwithstanding the true effect would be obtained by following the real situation of the outlines of the columns on the transparent plane, when viewed from *a pin-hole point*, they would appear disproportional when viewed from *any other point*; therefore, to accommodate the subject to our conceptions, and adapt the picture to all points of view, "*experience* and *sound reasoning*" have determined to draw the perspective views of geometrical subjects (when viewed in front) the *greatest possible point of distance*, consistent with a good effect; by which all apparent

distortion and disproportion is avoided, *without* DEVIATING FROM THE LAWS OF PERSPECTIVE. I may here remark, that this supposed necessity of deviating from the governing principles, has been of one great service to the genuine student, by filling the minds of cavillers with doubts and objections on the whole system, thereby shutting the door of knowledge against themselves, to the advantage of real merit and its encouragers.

John. I think, brother, if you go on in this manner, you will fix the door so wide open, that we shall all pass through; and the really clever fellows will *want elbow room,* there will be such a crowd.

George. Never fear, John; *clever fellows* have the art of remedying such trifling inconveniences: besides, the "*pursuit*" of excellence cannot be figured as a "*station.*" In arts, one degree of merit will be following another in such regular order, that their very nature is to *proceed*—admitting and encouraging succession by the example of vigorous perseverance; and thereby providing ample elbow room, as you term it, for all.

Ann. I had a question similar to Eliza's, respecting our view of *level lines;* such as the parallel joints of brick or stone walls, when *viewed in front*—must they be *drawn level and parallel?*

George. Straight lines, which are level and parallel, will always retain those properties in a picture, when taken

in a *direct front view;* which, I believe, you all understand to be *when the principal ray of your eye forms a perpendicular to the surface.*

Eliza. Excuse me, brother, for the trouble I give you; I have acquired just knowledge enough of the subject to *question* this point; although, I assure you, I have not the smallest doubt of the fact as you state it. But, surely, if I stood opposite a long wall, so as to direct my eye, by a perpendicular ray, to its side, I could not turn my eye right or left along the joints of the brick work, without *seeming* to see the consequent diminution of their size regularly converging to a point, as much as in any perspective view I can imagine.

George. Your question gives me an opportunity of clearing a point, which has confused many, through an imperfect construction, or a deviation from the original position. Now attend to this *plain remark,* and all question is at an end: the proposition *does not admit of your turning your eye either right or left;—a direct* view was proposed.

Eliza. Oh, brother! what "*half-formed insects*" our imperfect imaginations resemble! that which a minute ago seemed a very reasonable question, has now changed its shape to that of absurdity. Who, with a grain of thought, would propose looking to the *right* or to the *left,* for a demonstration of a question on a *direct view?*

George. And yet, my candid sister, some who have imagined themselves greatly your superior in the science, have maintained your first idea with great obstinacy.

Ann. Upon what grounds, brother?

George. By *departing* from the accepted and general practice of a *flat* surface, as a *transparent plane*, and inventing a curved one, on an improper conclusion, founded on the curved form of the eye.

John. And how would a *direct view* of the joints in the wall appear, if traced on a *curved* sectional plane?

George. They would then converge to the right and left; or as the lines of the floor and ceiling do, when viewed in the *convex* mirror.

Ann. This brings us to the full and clear acceptation of your *first answer on the subject*; y which, I feel convinced, we may safely abide.

Eliza. Now, brother, suppose I were to begin a drawing, in which I would represent several figures, at *various* distances; how should I proceed, so as to ascertain they were all their proper height?

George. Can you answer this question, Ann?

Ann. If the figures were intended to represent all one height, and were placed at equal distances, I should proceed as I did in finding the heights of the posts, Plate X. Fig. 1.; but as *various* distances are proposed, I must beg a little of your instruction.

George. First draw the size of your picture, Plate XI. N° 1.; then the horizontal line, which, *in a level view,* is (at the proportion of) 5 feet from the base line; then determine a point of sight, and draw a line from it to one end of the base line. Now, although this last line and the horizontal line both meet at the point of sight, yet every perpendicular line which could be drawn between these two lines is admitted to represent the height of 5 feet, as strictly so as the space between them on the marginal line of the picture. This may be termed the *converging scale,* by which the measure of every object in the scene might be geometrically ascertained; therefore the military character, on the base line, appears a head taller than 5 feet, because it is all above the horizontal line. The next figure is *evidently* shorter, because his eyes only reach the horizon, and the flag is found to be about 4 feet deep by this scale. The third must be taller, as his chin is above the horizon; and the horse's back rising just to the horizon, assures us he is full 15 hands high.

(*John.* Let me see:—four inches make a hand's breadth, three hands a foot—O yes, you are right, brother; 5 feet are 15 hands.)

George. And the exact distances of all the figures from the base line, and from each other, may be easily found by the rule given in Plate X. Fig. 1, by which the distances of the *posts* were determined. I have traced level lines from the feet

of each figure to the scale line, for the purpose of ascertaining the heights of any figure, in any part of the picture, at the same distance. For example: suppose a ladder, placed as far back in the *scene* as the third line; a man's height, on the top of that ladder, would be found by the height of the third perpendicular, on the *converging scale:* it would answer the same purpose if the figure were required to be represented above or below the level surface they are on. This is evinced in the scale of birds on the wing, as seen in the same plate (diagram); wherein it must be understood, that the diagonal or real distance is not attended to within the limits of a convenient angle of view; but *all objects* take their measures from the apparent measures at the perpendicular raised from the point they are found over; which *must* happen in some part of the converging scale.

Eliza. I perceive, that, to find their distances, the horizontal line must be lengthened, and the point of distance marked properly: from which, rays should be drawn across the points the figures stand on, till they touch the base line; and the space between each mark would show us the real distance between each figure, as well as from the base line.

John. And pray, sister, how would you measure that space, so as to tell me how many feet they were asunder?

Eliza. By the scale of 5 feet, which is agreed to be the height of the horizon of the base line, to be sure: do you not

recollect how Ann determined the height of the posts in Plate X.?

Ann. Then the breadths, as well as heights, are ascertained by these means?

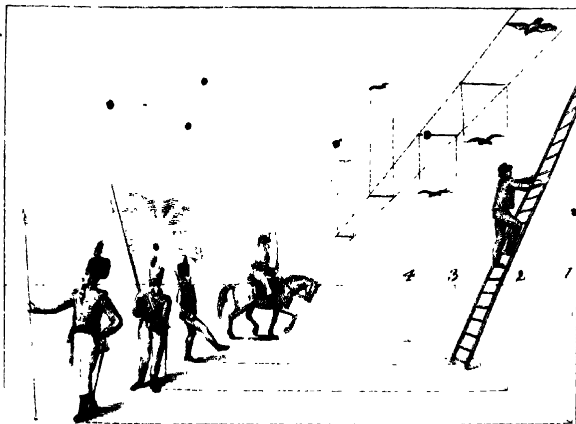
George. The scale of the birds alludes to *breadth* chiefly, but I will give you a proof in another way: suppose the figure *a, b, c, d,* Plate XI. N° 2, to be on the floor of a large room, and four figures (whether pillars or men, it matters not) stood on the circles 1, 2, 3, and 4, all of one size, that of the circles: their apparent sizes, as viewed from the word *eye* (where we will suppose you stand to view them), is found on the line S L, at the corresponding *spaces a, b, c,* and *d.* This line S L, represents the edge of a glass or transparent plane, and is termed the *section line;* through which, were you to view them, the rays of sight would pass to the several objects of view, and would determine the width they should be painted.

Eliza. How perfectly this section line conveys to my idea the edge of a glass set up for one to mark the objects on; the rays from my eye to the edges of the circles, passing across *that line,* appear to my mind to go through the imagined glass, as much so as when I first went to the window; and I have so accustomed myself to the experiment, that I almost see my own visual rays, as *absolute straight lines;* like those in your explanatory diagrams.

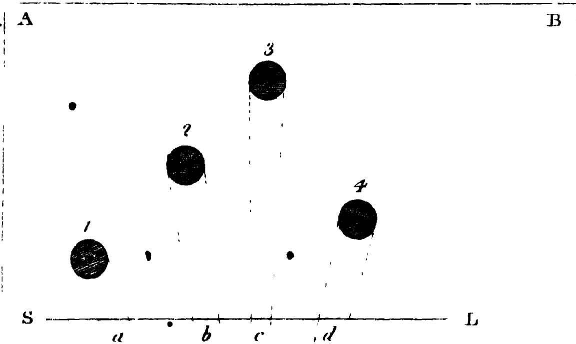
George. This proof of my success in teaching you is

PLATE XI.

No. 1.



No. 2.



Eye

delightful; and your clear comprehension arises from your great attention to what passed *in our first conversation* on the subject, which is a compliment equally due to you all.

John. We all thank you, brother: now will you permit me to propose a subject for our next lesson?

George. Most willingly: what is it?

John. I saw a plain building, with a roof which had *gabel* ends (see dialogue on *vanishing points*, Fig. 1. Plate VIII. and page 58, line 19), and I think I could draw it in perspective; but I cannot tell how I should convey an exact idea of its *measurement.*

Ann. Do you know the real dimensions of it?

John. I think it was about 12 feet long, and 8 feet wide, and it looked as high as its length to the roof; and the ridge of the roof appeared to be about 4 feet higher.

George. We will take this as the dimensions, and proceed; and I can bring it in proper course of study, by drawing it, as viewed, on an *unequal angle.*

Ann. Will you please to let it be an example of vanishing points of *different lengths,* such as you mentioned after you had explained the first figure of Plate VII.?

George. That was my intention, sister, which I expressed by the word "*unequal.*"—Come, John, to business: first draw a section line, then draw the ground-plan line, 12 by 8 (Plate XII. Fig. 1.), letting one angle of the

plan touch the *section line,* so that the sides of the plan make different angles to the *section line.*

John. What length shall I take for one foot?

George. Let it be a quarter of an inch, if your paper will allow on so large a scale—*remember that you always calculate that.*

Eliza. You mean that twelve quarters of an inch are to represent 12 feet, if I understand you right?

George. That is the meaning of the scale. Now, John, draw the *principal visual ray* from that angle of the plan which touches the section line, as a perpendicular *let fall* from it.

John. O yes, I know the *principal visual ray* must be *always* perpendicular to the section line.

George. Then for your distance, or point of the eye, you may take somewhat less than twice the length of the building. It will be a good rule to take the length of the two visible sides added, as the length of the distance; never less in *single* buildings, because the vanishing points would be so near as to make the inclination towards them too apparent. The point you have made will do: now draw rays from the other three corners of the ground plan to the point marked "*eye,*" and mark them, 1, 2, 3, 4; then divide the visible *end* in half at *h,* and draw a ray to the point marked "*eye.*" You have now only to find the two *vanishing points,* which is always done by drawing lines, or rays, from the point of the *eye, parallel to the two*

visible or *hithermost sides of the plan,* till they cross or touch the section line, and thus the vanishing points are always found. *This prepares* for the perspective elevation.

Eliza. I wish to draw that, if John will give it up?

John. As you please, sister.

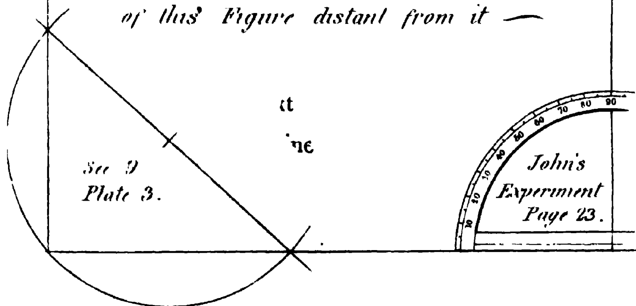
Eliza. Where shall I begin?

George. Draw a base line, just clear above the plan; then a horizontal line, 5 feet (by the scale) above the base; and *(for the sake of convenience)* draw the hithermost perpendicular rising from the base line, on a line with the principal visual ray, and mark 2 at the horizontal line; now take the length of the longest V P, from the angle 2 in the plan, and with this opening of the compasses from 2 on the horizontal line in the elevation, mark the longest V P; then repeat the like for the shortest V P. You must next mark 12 feet for the height of the wall from the base, and 4 above that for the height of the roof, on the perpendicular line which is to form the hithermost angle of the figure; and draw lines from it (at the base) to both the points marked V P, and also from the mark of 12 feet high, and one from the top marked *h r,* or height of the roof, to the shortest V P; then take the length from 1 to 2 on the section line of the plan, and mark 1 from 2 on the horizon of the elevation, and draw the line 1, 1, 1; then, from 2 to 3 on the section of the plan, set off the space from 2 to 3 on the horizon of the elevation, and draw

the line 3, 3, 3; then from the bottom and top 3, draw rays to the longest V P; and from the bottom and top 1, draw rays to the shortest V P, and the outline is obtained. And, from 2 to *h* on the section, mark 2 to *h* on the horizon of the elevation; and draw a perpendicular, from the bottom of *h*, till it touches the top ray, which gives you the apparent centre and point of the roof at *p r*; from that draw a ray to the longest V P, which gives the ridge of the roof; then draw a ray from the bottom *h* to the longest V P, and where this crosses the bottom ray which goes from 1 to the shortest V P, raise a perpendicular for the furthest point of the ridge, and draw lines from 1 and 4 to it, and from 2 and 3 to *p r;* which completes the outline in perspective, agreeable to the given dimensions, aspect, and distance: and were you to add to the ground plan, the proper marks of the situations of doors, windows, and ornaments, common to buildings, all their perspective *widths* would be found on the *section line,* according to the preceding; and their various *heights,* on the *hithermost perpendicular angle,* when *it touches* the base line, as in the present example;—and as you found the height of the wall to be 12 feet, and the height of the roof to be 4 feet more, all other measures of heights are to be determined: but to avoid the intricacy of too many pencil lines and rays on your drawing at once, it is advisable to secure their objects (in *pale* Indian ink) by

PLATE IV.   No. 1.

The Boundary line of a Picture, or aperture thro which a proper quantity of Subject may be Seen when the Eye is at least the length of this Figure distant from it —



No. 2.



C. Hayter Invt.   *The Base Line.*   Turnbull S.

degrees or classes, descending from general to particular, methodically, and rubbing away the pencil lines of what you have secured, to make clear for the following class. The first class should comprehend the general outline to all *exterior* angles, thereby securing those points, which must govern the drawing of the *interior ones*, which, in *due order*, become the next class to be inked in. The reason for making the outlines of your object with *pale tint*, must be obvious, when you observe that the visible evidence of all angles, is by the meeting of two *masses*, the one *whole* mass darker than the other, and not blacker at the edge, as too black an outline would give it. This may be proved by observation, in any room.

On Reflection.

Ann. I have some general ideas respecting the reflection of objects on water; are we to have any particular rules for this?

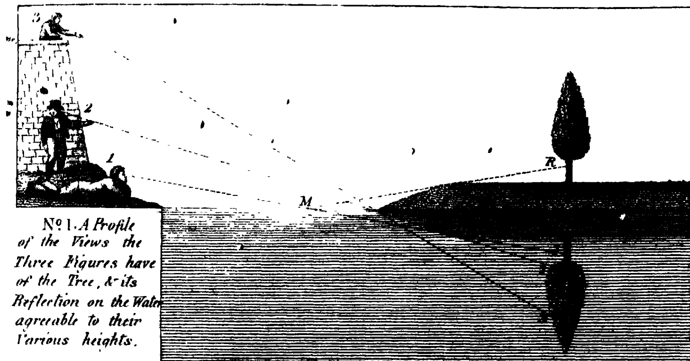
George. To do away all notion of mystery or difficulty, in this department of our pursuit, you may establish one clear and general idea as a clue to the right understanding of reflections, which is, THE REAL *object inverted to our view;* for were you to place any object on a plate of *looking* glass, and could bring your eye

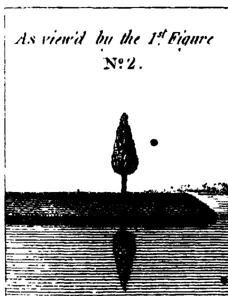
precisely to the edge of the surface of the plate, you would see the reflected object a perfect repetition of the real one, in all respects except colour, which would depend on the colour of the glass. We must first consider water as a perfect mirror. Plate XIII. No. 1, is a geometrical profile of a single tree, on the level bank of a river; and on the opposite side are three figures, supposed to be studying reflection: they are placed at various heights, for the purpose of shewing you the different effects of the same object. Now observe, the ray from the eye of the figure, who is lying along on the ground, appears to pass on into the water, at M, to the tree; but you must be certain it does not, and that there is no tree there; the *point* R, on *the real tree, is what you see at* M, because it forms an equal angle to the surface of the water line, with the ray from the eye to M; and also with the apparent continuance of that ray, to the trunk of the reflected tree, at that part which corresponds with R on the real tree.—And it is the interposition of the angle of the bank, which carries the eye up to R as the first visible part of the reflected tree, while his eye being on a line with the level part of the bank, affords an entire view of the real tree according with the second diagram.

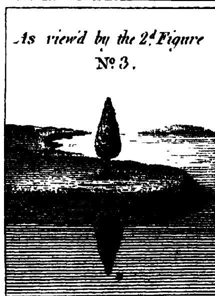
John. And I suppose, N° 3 and 4, are to be explained in the same manner?

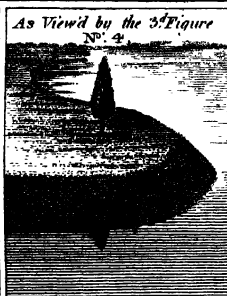
Eliza. Yes, undoubtedly: now I clearly perceive the

PLATE XIII.

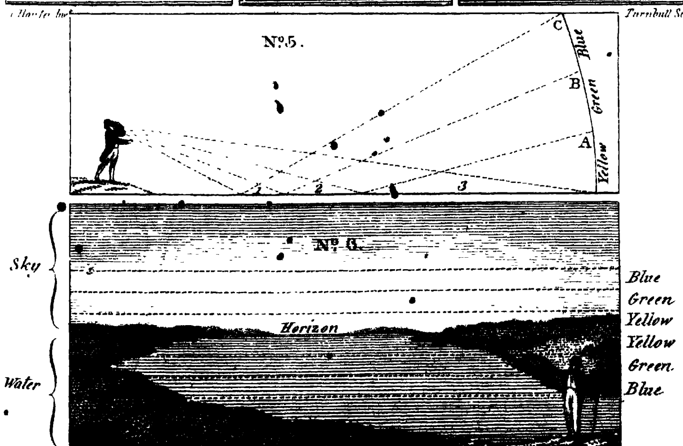








Hayter Inv. Turnbull Sc



Publish'd as the Act directs 1815.

difference there must have been in our three drawings, had we taken the view from the window, according with the situations given us in the FRONTISPIECE.

Ann. The variation could have been scarcely perceivable, we are so nearly one height as respects the horizontal line; but with regard to the view, right and left, your's and John's must have been very different, because each could see that which the sides of the window prevented the other from seeing.

John. Pray, brother, do you consider this a digression?

George. Certainly not, John, because the observations sisters have made arise out of the subject of explanation, and is a very satisfactory proof to my mind, that they unite reflection with application.

John. Well then, the truth is, I am very impatient to hear the explanation of the 5th diagram.

George. That is contrary to a piece of advice I gave you at the commencement of our studies; but I am ready, if you clearly understand the first four.

Ann, Eliza, and *John.* All clearly.

George. The fifth digram is a *profile* intended to show you geometrically the precise situation of the colours of the sky, when reflected on smooth water. You are to admit that the curved line is the sky meeting the water, and is divided into three equal portions of colour—yellow, green, and blue, according to the example

agreeable to this; the figure on the opposite side would see blue on the water, in the space 1, green in space 2, and yellow from space 2 to the bottom of the curved line of colours, which to the figure appears to be the horizon, which space is marked 3; and although these three spaces are so unequal to us when viewing the *profile*, they must appear equal to the eye of the figure, which I have shown in the sixth diagram.

Ann. How is it proved, that the colours must fall on those particular parts which you have assigned them?

George. By a determination proved to be invariable, "*That the angle of reflection and the angle of incidence are always equal.*"

Eliza. Will you please, brother, to favour us with some other proof in explanation of this rule?

George. If you will pay due attention to Fig. 1, Plate XIV. you cannot fail of comprehending the rule. Imagine all the shaded part to be the ground plan of a wall or side of a room, against which is a looking glass (A B), and all the rest of the space is to be considered the floor of the room; the small circles are stations, marked 1 *a*, 2 *a*, and 1 *e*, 2 *e*, where you are to place yourselves according to your initials, that I may explain this matter.

Ann. 1 *a* signifies my first position, so I shall go and stand directly opposite the glass.

George. And pray, sister, what do you see in the glass?

Ann. Myself, to be sure, brother.

George. And you think, I presume, that the reflection of your person is as far beyond or within the surface of the glass, as your distance from it?

Ann. Certainly, it seems perfectly so.

George. Now consider, the glass is about one eighth part of an inch in thickness, on which is an opaque body of quicksilver, through which nothing can be seen; and if it were not so, the glass hangs close to a solid wall, into which we need not endeavour to penetrate, as I see you are already convinced, that the subject of our inquiry is to be found on the surface of the glass.

Eliza. Pray, brother, is it the inner or outer surface of the glass that reflects the object?

George. Waving (in our present pursuit) the laws of *refraction,* you are to understand that it is the inner surface, which forming a perfect polish to the coat of quicksilver, makes that, rather than the glass, perform the office of a mirror, the glass only serving as a proper surface or varnish to the metallic body.

John. Then it is *in* the glass we see ourselves? Pray is it proper to say, "reflections *in* the water?"

George. No, reflection is returned or conveyed to the eye from the *surface* of the water; you must *therefore say* "reflections *on* the water."

Eliza. What is Ann standing opposite the glass for?

George. That I may convince you that the ray of re-

flection and that of incidence, *always* form equal angles from the surface on which the object is reflected. You must observe, Ann, that while you are viewing yourself in the glass, that the ray of incidence and that of reflection are one and the same ray, passing first from your eye to the mirror, and back again to your eye by the self-same ray; therefore, both are at an *equal angle*, that of 90 degrees from the surface of the glass.

Ann. Then this corresponds with the *central* or *principal* visual ray in perspective.

George. Precisely the same in this particular instance. Now, Ann, take a station so far to the left, as not to see your own reflection on the glass, as at 2 *a*; and Eliza, take a similar opposite station as at 1 *e*; now direct your sights towards the glass, and you will see each other's reflection on the point A, and your rays will be at equal angles from the plate, or surface of the glass.—Now, Eliza, change your station to any other part of the room, so that you can still see Ann's reflection. Suppose you move as to 2 *e*, you will then find the point of mutual reflection removed on to B, but the angles of the visual rays are as equal to each other as when you stood at equal distances from the glass.

Ann. I clearly perceive, and understand, that when we have made *more experiments*, we shall find it a general rule.

John. Now, brother, as you have explained the laws

of reflection on flat surfaces, can you show us how to find the glittering points of waves?—Surely this will puzzle him *(aside)*.

George. I am prepared, master John, at your service, with a gentle *uniform wave*, for the conveniency of making the diagram as intelligible as possible; and we must presume that every wave is a segment of some circle, which admitted, you have only to study the profile, Plate XIV. Fig. 2.

Eliza. I think I can explain it.

George. Please to proceed, sister.

Eliza. The level *dotted* line is to represent the medium of the surface when perfectly calm, above and below which you produce the curved line as the waves, and form complete circles out of the two extreme waves.

John. Aye, I know how to do the rest.

Ann. Come, show us.

John. Please to look to *Le Clerc*, as I have; in his second book, Proposition X. and XI. you may learn to divide an angle.—I interrupt you, Eliza; go on.

Eliza. Then you draw rays from the centre of the circles to the eye of the figure, and also towards the luminary. These rays form certain angles, which are *bisected*, and where the bisection crosses the wave, is the glittering point of each wave, as supposed to be seen by the figure on the bank.

Ann. And would that certainly be the glittering point in nature?

George. Yes, you may prove it by a very simple experiment, with a shining cylinder, a lighted candle, and a square table. John's little mug will serve for the cylinder: draw a pencil line correctly across the centre at bottom, and mark each end of the line up the sides, as a guide to place it diametrically even on a line, which you must make precisely across the middle of the table; (this may be done by chalking a strong thread, and snapping it to leave a mark.) Place the marks of the mug on this line, and let some one hold a candle to one corner of the table, whilst you place your eye to the other on the same side, which must be that which would have one end of the chalk line between the two corners thus occupied; then direct your eye to the mug, or shining cylinder, and you will find the glittering point exactly over the line it is placed on; then move the mug to any part of the line, making a greater or a less angle between the eye and the candle, and you will find the glittering point directly over the line.

Ann. Oh this is very satisfactory: you see, Eliza, if rays were drawn from the two corners of the table to meet in *any* part of the chalked line, they must form equal angles, and we have proved that the glittering point was always on the line—nothing can be clearer.

Eliza. And, as a confirmation, we find that this cen-

tral line of chalk, is the bisecting line of all the angles the mug made to the two corners of the table.

John. Would not this serve as a rule in painting the shining part, or greatest light on columns?

George. It is the very best basis I can conceive, and the only one I can give you.

On Shadows.

John. What rule have you for shadows?

George. Two general rules: sun shadows are governed by his altitude, and the rays are parallel; but the shadows produced by the obstruction of candle, lamp, or torch light, always expand, because they diverge from a point, or confined portion of light; whereas the sun being much larger than our whole globe, produces (in a certain imperceptible degree on the comparatively small objects of our study) a contrary effect; for the breadth of sun shadows will diminish by length, the particulars of which we may leave to your astronomical studies. Suppose the pannel, Plate XV. Fig. 1. to receive its light from a candle as L, let fall a perpendicular from it to the floor at F, from which draw the two rays, *a a;* and from the centre of the flame at L, draw the two rays *b b,* touching their corresponding angles of the pannel, till

they meet on the floor, and a line drawn by these two last points, will complete the outline of the shadow. Fig. 2, is a similar pannel illuminated by the sun, whose altitude I have determined to agree with the point L; and his aspect such as to cast the shadow parallel to the base line. I therefore draw the two terminal lines *c c*, parallel to the base line, touching the extreme edges of the bottom of the pannel; and the two oblique rays, *d d*, parallel to the point of the sun's altitude, as at L, touching the upper extreme corners of the pannel, as they pass down to the two lines *c c*, and finish the termination of the shadow, by a line touching these two last points.

John. And will these two specimens teach us how to draw the forms of *all* shadows?

George. They comprehend the principles for all; and if you will practise accordingly, you will be convinced of their powers. Should you require more examples, the authors I have mentioned *abound* in detail; but I have been taught to think, that *endeavour*, upon true principles, invigorates genius, whilst an example for every circumstance makes one idle. Yet as life is so definite, and art without any apparent conclusion, we must make the most judicious use of the discoveries, which time and genius have provided for us, avoiding the prodigal and *vain conceit of inventing our own eminence*, for although the KIND

DISPENSER of benefits may have conferred on us faculties of the highest order, we must be as much beholden to those who have gone before us, for any *permanent* height, as the upper strata of a building are to the preceding courses or foundation; and so sensible are great and liberal geniuses of this, that they gratefully and justly acknowledge the *grounds* and *basis* of whatever eminence they arrive at, to have been the LEARNING of their predecessors.

Ann. Permit me, brother, to call your attention once more to Plate XI. Fig. 2. As the evident variations of the size of separate objects, according to their distances from the *eye*, inclines me to think that a single figure would be affected by the rule you have given us, if one part of it were to be much nearer my eye than another, please to help me *clear* through this idea.

George. Inconsiderate artists, before they have learned from perspective the great importance of its usefulness, fall into great errors for want of the thought you have given the subject (most frequently in portrait painting); although many take a *real* measure of the face and features, which may answer a good purpose when a head, only, is to be painted. But in half lengths, or more, where some variety of attitude should be an object of equal importance with the resemblance, the *perspective, or apparent size* of

each part, must supercede the absolute measurement. Attend to the position of the figure' in Plate XV. as sitting to the *eye* which is represented as viewing her through the aperture of the frame, which is to contain the picture when finished; F F, the top and bottom thereof. Suppose the surface to be glass, instead of canvass—the rays from the *eye* to her head must pass through it, at *a* and *s*, which would give the proper size the head should be drawn. The same rule will determine the size the hands should be in the picture.

Eliza. But the *right* hand is so near the sectional plane, and the left equal distance with the head, that there must be considerable difference in their size, when painted by the rule you have given.

John. And would not that make the right hand look too large for the head and the left hand?

George. This question passes as a reasonable one, with *larger* artists than you, John. You must look back to our conversations on the subject of foreshortening, which, with the other explanations I have given you, will make you the best answer possible: you should all observe, that *one* perfection in a picture demands the society of others. The truth of perspective *alone* would not establish the excellence of the picture—it is of so eminent

a class, that all the perfections of art must unite therewith, to evince its importance. I would, therefore, seriously advise those who have advanced in the practice of painting, under the flattering and deceiving impulse of "*intuitive infallibility*," to relinquish the delusion; and learn, from the *knowledge of Perspective*, and her attendant elements, "HOW TO BEGIN A PICTURE."

END OF PERSPECTIVE.

LETTERS

ON

DRAWING AND PAINTING.

PART THE FIRST.

Letter I.

To Miss B——,

MADAM,

WHEN I proposed assisting you in the Art of Drawing and Painting, with the best instruction I could possibly convey, by literary correspondence, I did not expect you would have been so very diffident, as to make your first question so general and comprehensive. Your humility in professing to know nothing, not even "what to ask," and your desire "*to know all I can teach you,*" has involved me in an undertaking, in which my success can only be comparative. The pleasure to be derived from the practice of this most rational and delightful art, must be proportionate to the refinement of that taste and judgment which is founded, or at least matured, by a knowledge of what is good. To possess so great an enjoyment, is well worthy the most earnest and arduous application,—"*a work of merit must always be* a difficult work;" but it is that sort of difficulty which is as opposite to *trouble,* as *pleasure* is to pain.

The difficulty of the work in which I have volunteered my assistance, is greatly increased by your demand for "*all I can tell you,*" because it comprehends a desire to be informed of "*all that is necessary to be known on the subject:*" to lessen this, will only require due candour on both sides. What I cannot teach you from my own acquired stock, shall be given by *references,* which you may depend on; of which, if you make the use I shall recommend, our success will be equal; and I shall derive considerable confidence from knowing that my best endeavours are addressed to one, who will readily excuse my plain style of writing, while the matters treated of are found to convey the information required. It is not my intention to make any drawings for you in the course of this undertaking, except Explanatory Diagrams, because every kind of example you can choose, or require, are in great plenty at most of the print shops (to *begin with*); and as you advance, *busts, figures,* and good paintings, may be very easily obtained. Thus, by a regular progress, you will acquire the power of imitation, so as to begin to study from nature, and thereby find a sure footing on the direct road to the summit of art. Perhaps, before I begin my manual, it may be proper to give you a general view of what a student in painting should attend to, as indispensably requisite to ensure the means of conveying his thoughts to the tablet with propriety, so as to entitle him to a due proportion of the credit which *a good picture (from whatever source produced)* confers on its author: and it does not occur to my mind that I can convey these ideas better than by sending you the copy of a letter which I took occasion to write to Miss S, as follows:

Madam,—In a friendly conversation with your father, on your taste for painting, I endeavoured to prove the necessity of your becoming acquainted with *practical geometry*, perspective, and the *proportions* of the principal antique statues, as also of the *five* orders of architecture, so far as to retain a perfect knowledge of their distinct characters, on account of the frequent introduction of them in landscape and historical painting; and indeed, there was not any one elementary branch of the art, that I did not *strongly* recommend to your attention. But I was sorry to find him not only unaware of the importance of such attainments, but considered them as so many "*clogs to genius.*" Were you practising as an *amateur* only, the consequences would rest on yourself alone; but as you have taken up the character of an artist by public exhibition of your works, I feel it a public duty to intrude on a few of your leisure minutes, with some remarks on the subject; as I fear your father's opinion, "that your *great* and *natural genius* is *superior* to the controul of rules," must tend to bias your mind much, with impediments to successful progress.

Believe me, Madam, notwithstanding your acknowledged taste and genius, you will find it difficult to pass the ordeal of true criticism, without an *acquired* knowledge of what may be termed the mechanism of a picture. I readily admit that your *genius* may attend you *so far* as to sketch a general idea of a subject, conveying to one's mind an immediate recollection of some particular person, place, or historical circumstance; but you can go no further—*genius here wants her auxiliaries*, whose names I shall mention as introductory to your further

acquaintance with them, if you ever expect to rise above the humble sphere of a copyist. The chief of them are GEOMETRY, PERSPECTIVE, ARCHITECTURE, and LANDSCAPE, for your *scenes;* and the ANTIQUE PROPORTIONS, ANATOMY (both of *human* and *other* animals), CHARACTER, COSTUME, the PASSIONS, LIGHT, SHADE, REFLECTION, and COLOUR, for both *scene* and *actors.* And, in the same degree that you acquire the knowledge of using the aid these will give you, will your powers be increased.

First, without *geometry,* you are incapable of proving the truth of the parallelogram or oval, which is generally the *boundary line of a picture*; and as for PERSPECTIVE, I have the highest authority, as well as my own positive conviction, to assure you, that *without it,* you are liable to make as many *errors,* as *touches.* Next, how can you sketch any design, where *architecture* is required, unless you know its general characters at least; and if your subject should be landscape, sketch you may, but it will be impossible to finish without a thorough acquaintance with the detail of natural scenery, by study of its characters. Now, Madam, we come to the *actors,* or animated part of the picture, which (do not think me severe) *shall be all* crippled, and disproportionate, by the *best aid of mere genius,* unassisted by a *thorough practical* knowledge of *proportion,* and enough of anatomical information; and without that *expression* and *character,* which can only be acquired by studying the *physiognomy of the passions,* nothing worth the labour can be *expected.* *Costume,* well attended to, strengthens the great end of historic painting, and is indispensable; which will call on the embodying

powers of *light*, *shade*, and reflection, and the science of colours, to determinate into picture.

Now, to prevent delay on the merits of your proposed *auxiliaries*, or *elementary* help-mates, let us suppose you to obtain a speedy *off-tract*, or *tracing*, from a masterly picture, whereby you become possessed of a *perfect* outline: then let us set aside the original picture, and see what you will make of the pure outline *thus* obtained, in the department of *light*, *shade*, *reflection*, and *colour*: even aided by a recollection of what you saw of *this* in the original, and from all I have ever seen of the *genuine* productions of *unelementary* amateurs, I should expect this picture, when finished, notwithstanding its fine correct outline, to be *one entire mass of errors*.

You are pleased, no doubt, with the compliments paid to your *genius*, *taste*, and (what your fond father so mistakenly doats on) your *intuitive knowledge* of whatever you undertake. This is worse than the severest criticisms in its effects, tending to lull you into an indifference to those *aids*, without which the works of genius can only rank with the *wild* productions of nature; without her consistency, because nature is always competent, but the utmost efforts of art are often deficient.

It will be well for you to inquire into the natural cause, associations, and effects of *colour*, called *aërial*, or that which is produced by light, on the various masses of atmospheric matter; according to the circumstances of *situation* and *quantity*, of both one and the other. A studious investigator will find the *iris*, or *rainbow*, a kind of gamut (if I may be allowed the comparison), which will much advance attainment in this department. There

are learned theories, accompanied by illustrative diagrams, on the subject; with which, if you have perseverance to become acquainted, you will regret that *waste* of *time, canvass,* and paint, which is occasioned by the blind and conceited attempts of *mere genius,* without *science;* but when elements are practically united by progressive application, they will form a clue of *such an extent,* that genius may proceed without danger of being lost in the disappointing mazes of ignorance and conceit. You can never stretch to the utmost limits of elementary ground, while you are content to range the ample space of possibility, consistency, and *beauty;* and your clue will never tighten till you wander into the dark regions of *absurdity.*

Were you to content yourself with *copying* only, which in a moral point of view may be blameless; when chosen as a means of innocent and honest livelihood, in humble preference to any other *trade* or calling; unaccompanied with the presumption of claiming the consideration due only to the *few,* who blessed with talents, " scorn delights and live laborious days," in hope of obtaining that only genuine fame which has *perfection for its basis.* A correct eye, and practical command of hand in the use of the materials, would be almost all that a copyist could require; because forms, characters, lights, shades, and colours, would be all before him, demanding only attentive imitation. And I am not backward to allow, that a *very correct* copyist must be considered as a genius of that class and, by sufficient application, may seem to ascend a *step higher* on the scale of merit. If such an artist has a *good memory,* and *some taste,* he will draw or paint what he *believes* to be *original;* taking a *new* subject, and treating

it according to what he has copied from others. It is surely to *such* artists that the proverbial conclusion is applicable, that "*those who follow must go behind;*" taking example upon trust, and rather shunning, than seeking the reasons and causes of effects; or, if by misconstruction alarmed at the above predicament of "*those who follow,*" blunder on in their own uncultivated conceits, as if hastening to the summit of perfection, dreading, alike, precept, system, and example; and fondly hoping, that by the vehemence of an effort, the palm of originality and of fame must certainly be ensured. Too many *young masters* are content with this degree of originality; but it can only obtain them that sort of rank as artists, that musical geniuses acquire by ear; who, for want of scientific knowledge, must remain ignorant of the art to which nature particularly qualified them.

You will plainly perceive the course I think you should adopt, that of studying, to qualify your mind with *clear* and *decisive reasons* for your proceedings, observing always, that bad examples may be blamed as the cause of your errors, but are never to be admitted as good reasons; and you will make but slow advances in what is requisite for one to know, who is ambitious of *improving* the fine arts, while you sit down contented with the example set before you (however highly esteemed), unless you investigate the primitive causes, which must have directed the mind and hand of its author. For *rare*, very *rare indeed*, has it happened, that genius has been so great as to arrive at eminence, without some *elementary guides;* or to perform a work, according *with* rules, without an acquired knowledge of them.

Sir Joshua Reynolds has said, that rules are not the fetters of genius, but "*fetters* only to those who have *no genius*." I hope you will therefore agree *with* the conclusion which must follow, that scientific rules are the only *sure and easy*, though deliberate, conductors of true genius to the TEMPLE OF FAME.

Letter II.

MADAM,

IT gives me great satisfaction to find that you are resolved to follow the strictest discipline of elementary inquiry, and by such means alone can your genius receive a fair trial. "*Perseverance*" be your motto, and you *shall* have "*Success*" for your *crest*. As you have required the whole of my system, you will of course permit me to tell you what you already know—That you will only have occasion for a good black-lead pencil, a *sharp* pen-knife, and some drawing paper, or a *drawing-paper book*, to begin with; and your first attention *must* be, to the proper manner of holding your pencil, which, when you have *cut to a good point*, you will handle precisely as you would a pen, except a constant regard to preserving a much greater distance from the point, which will soon become habitual. Take care never to hold it too tight, but handle it with ease and freedom, using little more of muscular exertion than is sufficient to keep it from falling from between your fingers. It is of considerable importance to observe this, for those who do *not*, suffer severely, even to nervous de-

bility; sitting *locked* in all their joints in sympathy with this *apparently* trifling error. You should, for the above reasons, make an easy, graceful position while engaged in study, an object of the *greatest importance*, as some of our best amateurs have neglected *this*, to the injury of their health, as well as the natural beauty of their persons. I shall endeavour to impress on your mind, *my* opinion of an improper attitude while drawing, by a satirical observation made by a witty old teacher, who, seeing a tall lady stooping over her drawing till her nose almost touched the paper, said, "Why do you allow her to sit in such a posture?—is she near-sighted?—one would think she was drawing with her nose!" This aukward habit commences in *eagerness*, which is detrimental to success in all works of art: do not hereby mistake my meaning, by imagining that I recommend the opposite feeling—*indifference*, being the very worst sensation that the mind of an artist can have to combat—a placid and collected attention always intending the best; not by a miraculous hit-off, but patient, yet active investigation, will prove most conducive to success.

You will find it proper to set whatever you undertake to copy, *nearly* upright, and *directly before you;* a good reason for which, you will find fully explained in my Dialogues on *Perspective;* where you will be convinced of the absurdity of having, either your own drawing, or copy, in such a direction, as to look *obliquely* on their surfaces: see pages 51, 52, and 53, on foreshortening. You must therefore have a desk, or easel, which you may elevate, or lower, to a proper direction, by placing it before you on a table, and raising the desk-lid, till your eye is as near

the top edge as the bottom; that is, suppose a perpendicular wire was to be set up in the centre of the lid, then raise it till the wire, thus fixed, would point to your eye, as you sit in the easy position recommended; or, you will find it very convenient to take a light port-folio, or plain board (made for the purpose), on your lap, and rest it against the table where your copy is (properly set up), till by inclining your head easily forward, *not stooping*, you find your *eye* fall nearly perpendicular to its surface. Thus, Madam, you may be properly prepared to begin drawing; and the best observations in my power shall be the subject of my next letter: in the mean time, please to provide yourself with the materials required, and some Indian rubber; and, as it will be proper that you give early attention to the Perspective Dialogues, you will there find what other instruments are wanting.

Letter III.

MADAM,

THE first efforts of your pencil must be, to draw perpendicular lines, parallel and equi-distant one from the other, beginning with lines about one inch long, and (strictly observing the *ease* before advised) practise till you find you can draw a row correct, and easy, as fast as you could very deliberately count double the number, as 1, 2, 3, 4, while you draw two lines: then increase the length of the pencil point from your fingers' end, and make the like experiment on lines two inches long; and

practise till you can easily draw *perpendicular* lines, equal distance asunder, three inches in length; then repeat the above process with level, or horizontal lines. After this, you must proceed to *oblique* lines, both to the right and left; and to complete this command of the pencil, you must draw curved lines, according with the above system, till you can draw a good circle. This seemingly tedious and unentertaining beginning, will be amply rewarded in the very next stage of your study.

First exercises are *generally* done in *copy books*; and the only disadvantage arising from the using such, is, that a very important part of the commencement is too often neglected, that of a proper manner of holding the pencil, and placing the paper to be drawn on; as also your own position, which should continue your *chief* care, till habit has made it natural to you. *Then* you may draw on the *copy book*, if you please, while you recollect that you are not *writing* in it.

I much recommend the habit of *standing*, both to *draw* and *paint*, as most conducive to health: the arrangement necessary to such, requires no further direction than to observe the rule I have given; placing every thing at a suitable height, which if you have not ingenuity enough to contrive, and that in a *completely convenient* manner, you may assure yourself that you have not *yet* equalled Raphael, as a painter — or Archimedes, as a contriver. There cannot be a greater proof of *unfitness*, for the *fine arts*, than aspiring to the end, without due attention to the means: I therefore seriously advise you never to begin till you are well provided, and prepared with suitable materials, in all respects. Here observe, that a *dull-edged* knife will

waste both time and pencil, and is a certain proof of great laziness, or some equally improper disposition for the pursuit of excellence. If you pay due attention to preliminaries, you will study with much greater chance of improvement, than by any irregular mode, and with due practice you will almost forget that any system is required; the proper manual of the art will become natural to you; *then* you will feel the *benefit* of *that liberty*, which some shallow thinkers *imagine* should be granted from the first: but perhaps I can convince you of *their mistake* by the following observation:—

Suppose two, *equally* natural geniuses, were to commence the study of *instrumental music* at the same time; one with the best theoretic explanation of the science that could be written; and I would also grant *full* and clear methods for the application of the music to the instrument, but *no* master. To the other *genius*, I would admit, and recommend, *all the above*, under the government, and tuition, of the most judicious performer, *strictly* enforcing and explaining all the nice punctilios of time, air, chords, tones, half-tones, &c. &c. Can it be a question, which would be the *best performer?*

It may not be irrelevant to the subject, if I assure you, that the dexterous art of "*rolling on a drum*" cannot be acquired without a manual of some weeks' hard exercise; and *easily* as they *appear* to perform it, it cannot be attained by the *utmost* strain of genius, *except* by one certain method: it is the same with dancing, be the taste for that accomplishment ever so great. And indeed, *progressive tuition* is submitted to, on almost all occasions, more

readily and patiently than by ("self-dubbed") *natural* geniuses in drawing and painting.

How painful must it be to the feelings of an artist, to be under the necessity of *restraining* his disgust at the vanity and blindness of amateurs of *this* description; who boast of the only or *chief* cause of the absurdity of their productions, as a *great merit.* The first remark one generally hears, is, "*I never learnt*"—"I have taken it entirely of myself:" then follows, "What do you think of the work?" which, after all, was perhaps *traced off at the window.* Here's a predicament for an honest mind! but *Politeness* is a *deity who grants absolution to all her votaries—they* must be complimented; or the man who would give an opinion according to his judgment will be metamorphosed into a *bear,* and most probably may be treated as such, where this sort of foible is indulged.

Letter IV.

I HOPE, Madam, my last convinced you of the necessity of obtaining a *command of hand* by the *most simple* essays; for while you were engaged in attention to your position, and that of your *pencil and paper,* an endeavour to amuse your fancy, by even the slightest association of lines which could divert the mind from its first object, would have been premature.

I now wish to impress on your mind what I mean by *command of hand.*

When you can easily mark the form you previously in-

tended, not by putting your pencil to the paper, and *letting it fly promiscuously*, almost where it might happen; but a governing, steady, easy hand, *obedient in every part* of the whole line to your *well*-convinced mind as to what is requisite, so that you may take off your pencil precisely where you intended; and slope, or curve, to the right or left, whenever the original dictates.

Never make a *compound* line by one motion of the pencil: suppose two lines forming a figure like the letter A or V, draw one side, then take your pencil off, and draw the other.

Take great care that *all* lines which are *perpendicular*, or level, in the original, are *strictly so* in those particulars in your copy, as otherwise your buildings will appear in danger of falling down: *this must be studiously observed.*

I have proved it to be a very good gradation of practice to make *simple compositions* with the "radical lines," as the first advance towards the great object, and at the same time continuing the exercise of the pencil more than that of the mind. It will be a pleasing and very easy undertaking (see Plate XVI. Fig. 1.) to draw two or three horizontal lines, one above another, as so many steps to an intended door-way, diminishing in length at each end; then, *near* the end of the top line, or step, draw perpendiculars, about the proportionate length of a column; and for the inner sides of the columns, draw two more lines; these must be *all* of one height; at the top of which, draw two level lines near together, the whole length of the top step, and a little projecting over the outside perpendicular lines; these will represent steps, columns, and the level part of a pediment; then place the point of your pencil

a little above the top line, in the centre, and draw oblique lines, from this point, down to the ends of the top parallel of the level parts of the pediment; and you will have the figure of a frontispiece to an entrance. Now, if you choose to have an arched door-way within it, draw a half-circle, the top a little distance from the lower line of the pediment, and the two lower points the same distance from the columns, and continue the lines down to the top step. Thus you may easily invent, or copy, many lessons, proper for the accomplishment of handling the pencil freely, such as *outlines* of alcoves, bridges, temples, or any *uniform* figure (see Figs. 2 and 3), which may tend to produce a correct eye and good taste while the *hand* is forming; taking caution not to enter too deeply on very full subjects, till your pencil will readily obey your ideas, as well in drawing oblique or curved lines, as perpendiculars and levels.

The *curve* is that which will occur throughout the whole of animal drawing; indeed, it is considered the *radical source of beauty* in general, and must claim that share of your attention which its importance demands.

I would advise you now to purchase a few of the best *elementary* specimens of such subjects as you find the particular objects of your choice. Guided by the judgment of a good connoisseur in this matter, your own choice may, in a due degree, be consulted, taking care not to suffer your enthusiasm, or want of judgment, to overstep your tender experience. A little practice, *every day*, will give your powers increasing strength; and the finest subject you can desire, may be either purchased or *hired*, to put your ambition to the test.

Whatever you undertake, perform with *deliberate care* and PERSEVERANCE; and when you have chosen a piece to copy, do not, on any *unnecessary* excuse, leave it until completed. This may lead to a proper caution not to undertake any great work at the first: a simple cottage, or plain building, with the little accompaniments natural to them, will be sufficient. Trees will require study in the detail, so that you may learn the various *touches* and *forms* peculiar to their characteristic distinctions; and rely on it, nothing but practice, and its consequence—*experience*, can render these matters easy to you.

Letter V.

MADAM,

IT is the most grateful reward to my endeavours to find that you so fully approve of my methods and remarks, and I shall detain you no longer in the confined walk of an entire novice, but immediately proceed to that stage of the art, where my observations may be more particularly serviceable. Let us suppose you seated before a clear intelligible subject (a landscape perhaps), *completely provided according to the instruction* already given. You must take a general and deliberate observation, to determine the relative situations of the *principal objects*; such as the height of the horizon; the nearest angle of the *most* conspicuous building; the whole width of a building; its height; the height of the largest trees, and their relative distance from the first or principal object; as also from the margin of the drawing.

"Take care to begin all objects the right distance from the base line, which is the bottom line of the picture: those parts touched lightly will be sufficient to direct your eye to the situations of other subordinate parts of your drawing, until the whole becomes *lightly*, but correctly hinted at; regarding, first, the relative *situations* of all the conspicuous parts of your subject.

You will find it good to determine the situation of those leading points, by observing whether they are at *half*, one *third*, or one *fourth* part, more or less, of the whole length or breadth of the picture; or between any two principal points: for example, examine what portion of the picture the land takes, from the base line to the horizon, and you may very probably find it about *one third* the whole height. Remark any variation to this with care, and that point may be settled to a geometrical certainty almost; and, in the same deliberate way, find all the other remarkable objects. The touches you will make to obtain these points, will not require great attention to drawing, although the more correct the better, as they are only so many points through which your pencil will pass when you proceed to the minute outline, in doing which you must have constant regard to the proportion of one part to another; observing always what part is perpendicular, parallel, or on a level with some other part, already noticed by a studied touch. Precision can never be carried to too great an extreme, in the execution of any SUBJECT worthy the pencil: technical propriety will always merit so much of your attention, as to secure you from the critical censure of the mechanic; suffer not the "cobler to find fault with a shoe." Many objects in

landscape are of fixed dimensions, and should never be given contrary to their proportion; for instance—a brick, and its strata of mortar, always measures three inches; this must make four course in the height of one foot, or twenty-eight to the height of a seven-feet door frame. Pantiles cover about seven inches in width; therefore, in a roof sixteen feet long, twenty-seven rows of tiles, at least, will be requisite. Steps are generally between the height of five and eight inches each; then three eight-inch steps would rise to the height of eight courses of bricks. Sheds and out-houses are covered with boards (called weather boards), which are seldom above ten inches wide, from the edge of one board to the next; and more frequently six or seven inches, which should have due attention, when finishing, from memory, sketches which may have been hastily outlined from nature, or when composing from fancy. It would be inexcusably dull to give any further explanation of particular measurements of this familiar kind; and had I not very frequently seen instances of the ill effect arising from a total disregard to the truth, where the artist *evidently* proved that *a proper representation* of the above-mentioned "*trifles*" were intended, I should find it proper to apologize for supposing it necessary to engage your attention to them at all.

You must accustom yourself to touch lightly and tenderly, that you may, the more conveniently, correct any error in the disposition of the parts.

As soon as you have marked all the general outline, rub the drawing over lightly with some crumb of bread (not damp or too new), leaving the whole barely visible. Having thus, by previous application, determined every thing

to be properly situated. Your whole attention must now be given to correcting and completing the *form* of each part, touching with due spirit on shades near the foreground of your drawing, and receding towards the horizon with a tender hand, and the eye of *perspective*. Begin this stage of your work by drawing the *principal* objects, *first*, as at the commencement; observing here the ease with which you may descend to the detail, after having thus secured all the principal points, there will be nothing too wide, or too narrow, too high or low, too much curved, nor inclined either way: all proportions and positions will agree with the original; and now the more attention you pay to every part, the more certain will be the effect of the whole.

By the outline, you are to understand every mark requisite to determine the form; not only of the extreme edge, or outside line of the whole figure, but of *all discernible marks* which have any share in constituting the expression and character of the piece, of which I shall have occasion to say more in another place. When copying, you cannot have an outline too correct, as the expedition which is requisite in sketching from life, is not here necessary. It is a very bad practice for young students to sketch hastily, and proceed to shading and tinting, hoping to make a *great show* of their progress in a little time: *disproportion*, *blunders*, and *oversight*, will torment, and tend to disgust those who proceed in such a manner. Yet there are some fertile fancies which (although unacquainted with the means of producing a correct design) should not be too much confined, when a happy thought presents itself; as the spirit of composition might evaporate under the care and endeavour, which is unaccompanied with any other know-

ledge than that, *it ought to be correct; such a mind* will improve in this essential in good time, and has *my* humble opinion in favour of early compositions; and that you may sketch your *own ideas* as free, and as rapid as your imagination may dictate, as memorandums for future study; recollecting that this licence given to your genius, in invention and composition, is only allowed as a stimulative to the exercise of deliberate judgment, and mechanical accuracy: without which your *thoughts* must remain in their original state, as they can never become *works* until you are possessed of, and use, the means to make them such.

It must be granted, that there is no material object without its *particular form; this form* being a *substance,* will produce its consequent *lights,* and *shades,* and furthermore must have *some local* colour peculiar to each part, besides that which may compound with it by reflection from the tint of the sky, the colour of a room, or the influence of some neighbouring object, or perhaps altogether. As this must be generally admitted, it of course follows, that whatever you choose to study the imitation of, should be considered as demanding your utmost attention *in systematic order;* first, of form, or *outline,* which will comprehend expression and character; secondly, of light, shade, and reflection; and thirdly, of colour; that the *whole* may be accomplished with success.

Now, as all works of art will, of necessity, be progressive, a *good* system of *beginning, proceeding,* and *finishing,* must be desirable.

First, as every thing has a *certain* form, *that* must be the earliest object of attention, according to the methods just before mentioned; which, when obtained, releases you, in a great degree, from a very considerable share of atten-

tion, with liberty to advance all your thoughts to the second part of the subject; which is, the modelling or relievo, by means of *light* and *shade;* thus *completing form* and *projection*, or substantial appearance: then follows *colour*, of *which* I shall treat in *due course*, as we shall not yet arrive at occasion to explain more on that head.

What lights and shades can correct bad drawing? or what is the use of colour to either? *None*. First *draw* correctly; then study light, shade, and reflection; which, when you have accomplished, *colours remain a vast* theme of interesting difficulty for your future investigation. But, perhaps, you will be pleased to know, that when you have acquired proficiency in the *two first* parts of your progress, and can proceed to finishing, you will *then* draw and shade with your colour, in a certain proper degree, performing the whole, except the *first sketch*, by and under the comprehensive term "*painting*." Before I close this part of our subject, it will be proper to advise you to study a *second* copy of what you have in hand, *entirely from memory:* never look at the original for *this*, but trust to your recollection, and try the strength of your critical powers, and you will find the *utmost advantage* from such practice, by the improvement of every faculty requisite to an artist.

Letter VI.

MADAM,

I TRUST the substance of the foregoing letters will conduct you through the outline of *any* plain *subject;*

and, when practice has confirmed you sufficiently courageous, you will attend to the following observations on drawing *animated figures,* which are as essential to a picture, as *actors* to a *stage;* and, indeed, this primary object of study is the *best,* as well as the *shortest* road to eminence, in the whole art of the design.

It is the beauty and superiority of the *human figure* over all other animals, which constitutes it the chief object of a painter's study; and so vast is the *variety* of *forms, attitudes,* and *expressions,* which are continually changing, according to the infinity of incidents to which all are liable, that *few, very* few indeed, have arrived at so great a degree of eminence, in the imitative art, as to do justice to the noble character under which man should, according to his high rank amongst created beings, be described.

We are humbly to recollect, that it is his mental character which determines him to be "the NOBLEST WORK OF GOD;" from which it consequently follows, that to imitate the *mere animal man,* as we too generally find him, is not the greatest end of the art: under whatever character we may find occasion to make the *human figure the object* of our study, the *primitive* superiority of our subject, over *all others,* must be constantly kept in view. We have the highest written authority for our conclusions on this point—"LET US MAKE MAN IN OUR OWN IMAGE."

It is a subject demanding *serious* reflection, to observe the wonderful perfection of the ancient Greeks, who, in their dignity of thought and purity of design, were unassisted by the REVEALED *history* of man's origin; yet

they seem to have been inspired by the most exalted ideas, possible for human intellect to have formed.

By what association of means they arrived at this *summit of perfection*, is a secret divulged, with a very sparing hand, to all who have succeeded them; yet some few glimmering, but very distant lights, united with the most rational conclusions of inquiring writers, have given us sufficient assistance, by their laborious investigations, to proceed, as circumstances may chance to bring forth any additional evidence of antique sublimity; and enough of the works of antiquity have been protected from the power of *all*-devouring time, to show us, that the perfection of art must depend on the imitation of the *most perfect* forms in *nature*, in *all* her *various species* and *characters*; insomuch, that in addition to the *truth* and beauty of animated forms, the appropriate expression so wonderfully associates, that a lively imagination would almost conclude "*a Grecian statue has a soul.*" And it is no less worthy observation, that throughout the whole of their works (at least those on which the *eminence* of the ancients are founded) they have uniformly adhered to what is particularly understood by the word "*beauty*;" so that notwithstanding the agony, and consequent contortions, so exquisitely expressed in the group of Laocoon and his sons—the representation of the melancholy fate of the Niobe family, and the terrible energy of the Gladiator repellens; all of whose personal superiority over ordinary beings, is, perhaps, heightened by the successful appropriation of expression in these wonderful specimens of the perfection of art.

And, I am inclined to believe that one of the causes

of the decline of the *pure* and *great* style, may have originated in descending too minutely to detail when working after imperfect models, and substituting distortion and deformity as the representatives of the inferior characters in their groups, as a corrupt means, perhaps, of producing a contrast to the advantage of the hero of a group.

Although it may be frequently, if not generally requisite, in obedience to the truth of a subject, to describe the effects of passions, depravities, and other accidental circumstances, with physiognomic punctuality, yet due attention to what our great predecessors have been able so happily to accomplish, without treating absurdity absurdly, should influence all your endeavours; as there can be no means of success so certain as the acquiring a thorough knowledge of whatever you undertake, that you may be enabled thereby to distinguish between perfect and imperfect conclusions; taking care, in the pursuit of our present subject, to give to virtue and beauty the best attributes; and never endeavour to render vice or deformity agreeable, by the misapplication of your knowledge and abilities.

It is impossible for you to conceive too exalted an idea of this main object of a painter's study. For, without a competent and just conception of its importance, nothing *great* can be expected; and it shall be my utmost study to give, and recommend, such methods of beginning, in the mechanical department of this subject, as will enable you to proceed with certainty.

Beauty, *grace*, *expression*, and *character*, are in the province of genius, "or right-mindedness," and depend much thereon; for this you must apply to *all* the means required; taking every opportunity of cultivating and

improving your *taste* and *judgment,* that nothing may be wanting to constitute the *perfect* amateur.

Letter VII.

MADAM,

THIS is that stage of the student's progress which is the greatest test of his *patience* and *perseverance.* A very considerable majority of those who employ a drawing master, entertain a mistaken notion of his powers, and expect to advance in fame among their friends according to the *sum* they pay him; *instead* of the *attentions* so requisite to success, which *they* should *unremittingly* pay to *his directions* and *their studies.* If you heartily determine to proceed properly, you must relinquish the most *distant desire* of praise, except a fair compliment to progressive improvement; and, in the same degree that you have patience to lay a good foundation of *practical* and scientific knowledge of the art, will your ultimate accomplishment be ensured.

Your certain test will be your sketch-book. Try from time what you *can do*—you will thereby perceive wherein you are deficient.

Do not expect that habit will teach the pencil to move the right way, without you direct it by right ideas; *all success* depends on the means. The painter, who by accident produced the foam at a horse's mouth, by throwing his brush on the picture in despair, could not claim the merit of the effect produced: accident too seldom succeeds to place reliance on it; and, as I have before had occasion to observe, the *means only* are security for the end.

The following *general* proportions are only given as good memorandums, to *begin* your sketch; and a thorough recollection of them will be of great advantage in your first thoughts of composition; but you cannot proceed to the more minute articulations, and nice divisions of the figure, without you acquire a familiar acquaintance with the "*antique proportions;*" which may be had of Laurie and Whittle, Fleet Street, or Carrington and Bowles, St. Paul's Church Yard, folio; where, at the same time, you will do well to get Le Brun's Passions. A General View of Anatomy, by Tinney, may be had there, tolerably correct, *as respects* the matter; but the figures are not equal to those of *Albinus*, which is a very complete but expensive book. The pocket volume by Innis, is good: Bell's Anatomy of the Bones and Muscles, is a book also worth your attention.

All these you will have time to study, at intervals most convenient to yourself, while you are forming a *good taste*, and improving your hand, after *good* specimens of heads, hands, and feet, which should be well understood before you attempt to draw the whole figure, as a regular study: yet I think it proper to have a sketch-book always at hand, and to accustom yourself to sketch your best ideas of historical and other subjects. Raphael, Le Brun, and Lavater, for characters, may be of great assistance, in these juvenile exercises; which should be accompanied by a proportionate study of scenery, with perspective.

GENERAL PROPORTIONS OF THE HUMAN FIGURE.

The whole height of the figure is, for tall figures, 8 heads.

Figures more robust are divided by seven heads and a half in height, which is equal to 10 faces.

It will be worth your recollection to know, that if the figure of eight heads be six feet high, the figure of ten faces will measure five feet seven inches and a half in height.

Perhaps, all the various characters you need design for proportion and *anatomical* information, may be found between *these two extremes: genius* and *good* judgment will, however, have *discretionary liberty* on *this* point.

The inside line of the legs and thighs of a figure to the beginning of the body, measure half its height: in tall figures they are above one-half, and in shorter not one-half the figure—4 heads or 5 faces.

The quarter parts of the heights are from the top of the head to the arm-pits—2 heads, or 2½ faces.

From the arm-pits to the bottom of the body, or middle of the figure—2 heads, or 2½ faces.

From the lower part of the body to the joint of the knee—2 heads, or 2½ faces.

From the knee to the sole of the foot—2 heads, or 2½ faces.

The length of the foot is about one-sixth of the figure.

To the figure of eight heads it is one-twelfth part of a head more than 1¼ head.

To the figure of ten faces it is exactly 1¼ head.

When both arms are extended, the measure from the ends of the middle fingers is equal to the height of the figure—as 8 heads, or ten faces.

The breadth of a man, when his arms are placed close to his sides, as viewed in front, is one fourth his height—2 heads, or 2½ faces.

From the top of the shoulders to the elbow—1½ head, or 2 faces.

From the elbow to the wrist is 1¼ head, or 1⅔ face.

The hand is in length equal to the length of a face, or ¾ of a head.

The breadth of the hand is equal to half its length, and is also half the width of the face.

The thumb is in its length ¼ of a head, or the length of a nose.

When the arm hangs straight by the side, the joint of the wrist is at half the height of the figure, or on a line with it.

The diagonal, or longest measure of a head in profile, is about a head and a quarter from the lowermost extremity of the chin to the uppermost part of the back of the head, or nearly *the length* of the foot, and also of the lower arm-bones from elbow to wrist—1-6th of the figure.

When the arms and legs of a figure are extended so as to represent the four points of a square, the navel will be the centre.

I shall not here give any general measure for the breadth or thickness of the limbs, because they vary much in these respects according to character. You will find them in a manner you may rely on as a standard, from the book I have recommended on antique proportions. I have here given you sufficient to enable you to practise *composition*, which is one of the best stimulas to further inquiry.

We can now proceed to the proportionate divisions of the head and features, which you must learn to recollect perfectly before you *can* expect to draw the whole figure, even in a sketch; and you will presently observe that this cannot be accomplished without separate and due attention to each part of the face, for it would be folly to attempt to draw a whole head, until you are perfect in each feature.

The drawing of the front of the human head is mechanically begun, by an outline nearly resembling the shape of

an egg, or somewhat of an elliptical form, in the proportion of about four in length to three at the greatest breadth; as thus, if you draw an egg form, four inches long; draw the width full three inches; let the upper half be a half circle, and the lower *parabolic;* this figure must be divided in half by a perpendicular line, which divide into four equal parts, horizontally; give one to the top of the head, one to the forehead, one to the length of the nose, and the lower part divide into three equal portions; the first part, next to the nose, is the upper lip, finishing at the opening of the mouth,—the second, the under lip to the beginning of the chin,—and the lower third contains the chin. Touch with your pencil to mark for the top of the forehead, at the uppermost division; then sketch a faint line across the oval at the top of the nose, as the *bottom* of the forehead; another at the third division, for the bottom of the nose; another for the meeting of the lips, and a mark for the top of the chin. Next divide the length of the nose into four equal parts; giving one part for the height of the wing of the nostril, and one, from the top of the nose, for the line on which the eyes are to be situated, and there will remain two parts, or half the length of the nose, between the eye and the top of the nostril. Then draw the line for the eyes parallel to the centre horizontal division, which crosses the face at the bottom of the forehead and top of the nose, and divide it into five equal parts. One part is the length of an eye, and you thereby have the exact length of an eye between the eyes: divide this space into three, and the middle division will be the breadth of the bridge of the nose. The width of the nose, including the wings of the nostrils, is the length of an eye: the mouth is a

little more. The eyes open to about *one-third their* length. The pupil of the eye is a circle of one-third the length of an eye; the inner dark circle (or sight of the eye) is *full* one third of the pupil. The eye-brow is the length of the eye, and is about the third, or opening above the upper eye-lid. The *bottom* of the ear is situated on a level with the *bottom* of the nose, and the *top* is level with the *eye*.

In profile, the *back* of the ear, the *top* of the fore-head, and the *point* of the chin, form an equilateral triangle.

With this arrangement you might sketch a good situation of all the features, which you should practise as soon as you have learnt the drawing of *eyes, nose, mouth,* and *ears,* separately.

You must study from the *very best* examples. Raphael, Morgan's Antiques, and Cipriani's Drawing-book, are of this class. There are many other elementary books of extremities of the human figure; many of which, although pleasing to the eye and the fancy, are too incorrect. In your own studies, habituate yourself to the most severe criticism, and you will so correct your work as to render other criticism more approving than severe: it is a weakness to say, "There is *something amiss* in my work, but I cannot tell what." This *may* be; but it is *too* often a dread of the trouble that would follow the discovery, which thus blinds you to your own errors. *Excellence* must be the only hope of an artist.

Take care to avoid the partial (and perhaps ignorant) encomiums of your acquaintances, as much as *possible*: indeed, the *bits* or *parts* you may have as yet studied being

no pictures, few besides an artist will be qualified to pass a genuine opinion of them.

Letter VIII.

MADAM,

IF you have duly attended to my advice, I may fairly conclude that you can now manage your pencil freely; and I hope the rules for beginning a copy, and an acquaintance with the proportions, have enabled you to make some correct outlines. When you find yourself thus qualified, it will be proper for you to enlarge your style, and use chalks.

There are three sorts of native chalk—*black*, *red*, and *white;* and of the first there are two natural sorts—the one is hard, and is called Italian chalk; the other is softer, and is French chalk. They are generally used on coloured paper manufactured for the purpose, which is known by the name of silk paper. The most agreeable colour is French grey, it being a sociable tint to both the black and white chalks. Charcoal, to sketch with, is necessary in this sort of drawing; and paper, or leather stumps, may be found of use: they are generally provided along with the other materials I have mentioned; as also a port crayon or two, to fix the chalk into: *these are indispensable.*

The manners of using the chalk are various, each draftsman forming some peculiar method of his own.

The best system I can give you, is to draw a *correctly-proportioned* outline with the *charcoal;* and, as you find

your outline improves, continue to touch bolder, noticing the breadth and form of shadows, and the most conspicuous markings of features, limbs, or draperies. The certainty that this can easily be cleared off with crumb of bread, must not lead you into a *careless, dirty* method of using charcoal; for, with a little attention to its soft texture, and a mind properly intent on the success of your drawing, you may acquire a tender elegant touch, and produce nearly as fine a drawing as with any other material.

Design with your charcoal almost as cautiously as though it could not be rubbed out: this must make slow progress at first; but be assured, if you make a hasty, erroneous outline with the charcoal, you will have double the trouble with the chalks: besides, if a *true line must be* obtained before your drawing can be considered worth rendering more durable by the chalks, can any material answer the purpose so well as charcoal, which can all be cleared off so easily? You cannot begin your sketch better than by attending to the rules I have given you for *beginning in general,* as *far as respects the leading points* of the figure; observing *first* the *inclination* of the head, which, being drawn tolerably correct, will serve as a point from which all the other situations may be easily determined; taking due measure (with your eye) of the whole field or surface which is to contain the figure or figures, it being the heedless fault of *many* to *dash* away, without ever considering where the feet and hands may extend.

As a figure may be *eight* heads* in height, never begin the head of a standing figure larger than one-ninth or tenth part the length of the paper, and nearly a full head from

the top. Observe at the same time the extent of the limbs, right and left, to determine well what situation between the two sides will best bring in all the figure: this will save the unnecessary trouble and disagreeable effect of pasting and patching, to accommodate your first thoughtlessness.

[I know there are those who *value* themselves for such irregularities, mistakingly thinking it a sign of the ardour of genius. Permit me to inform *them*, that genius, truly so, must be a composition of excellencies; the elements of science must unite their powers, *performing* a work *equal* to the thought. I refer to the examples of the great only, whose patient perseverance in the execution of their works was equal to the greatness of their conceptions.

Were the wonderful statues of the Gladiator, Apollo, or the groupe of the Laocoon and Sons, produced by a flash of thought? Or was St. Peter's at Rome *completed* by an accidental hit? No: neither had Genius done her part, when Raphael had determined the composition of his Cartoons. — *Such works!* can only be perfected when genius is *genuine;* beginning with inquiry, proceeding with knowledge, and finishing with certainty.]

Proceed, by carefully observing what parts are on a level with each other; what point another may be perpendicular to; or, which way the lines curve, or incline; what *parallels* are to be found; or how much they deviate from such geometrical forms. In this you will have the assistance, and must be chiefly under the guidance and government, of the *general proportions* of the *human figure,* as given before, for the purpose of helping you in your first contours and compositions. But as copying is much

dependent on a correct eye, let no conceit of systematic knowledge seduce you into a deviation from your subject, which should be *imperious* in this respect; for it is not probable that the small portion of critical determination you can yet have acquired, can be sufficient to enable you to deviate from your model with *advantage*; indeed, if you make choice of the *best*, both statues and pictures, for your improvement, you will have attained a *glorious height* indeed, if you *ever can*, successfully, let this bind you to your subject, till you have attained knowledge, and the *right use of it, by practice*. And, while you thus attend strictly to your example, great care should be taken not to suffer yourself to be led into a very common error, *that of overstepping the extremes*; as thus, it may be *extremely* adapted, by a broad, square, and bold, decisive marking, for its original purpose (perhaps, that of a great height, or distance); and notwithstanding the forcible manner this may affect your mind, as to the extreme, you must be much on your guard, at first, to avoid destroying the whole beauty of your copy, by seizing (I may say) on those very extreme points with too bold a hand.

If, in taking a portrait, you find any feature extremely large, or wanting in beauty, you surely would not be so unfavourably punctual as rather to increase than diminish disproportion. It may be useful to some, to mention a few instances where this sort of precaution may be of great service. The book of heads expressing the passions, after Le Brun, may best serve this purpose, as they are likely to be in the possession of most students; in almost every attitude, expression, and feature of which, you will find

that sort of extreme beyond which error would increase, and the character be thereby lost;—and if you should study from the outlines by Cuzzens, called "*Elements of Beauty*," you will have to avoid the opposite extreme as they are put forth as such, with a view to show how much expression may be given without that forcible marking which Le Brun has throught proper to his purpose.

As soon as you have completed the charcoal outline, and entirely decided that every part is right, so far as regards *right situation* and general proportion, you should mark the highest lights with white chalk, with *nice attention*, as the truth of the model depends much on the right *situation*, form, and force of these touches; and the earlier they are correct, the better.

This completes the charcoal, or first process, and your next should be to wisk off the charcoal with your handkerchief, or a feather, so as just to leave a visible trait of all you have done. Take care *not* to use crumb of bread for this, as it will take off too much, and thereby give you the unnecessary trouble of studying the situations over again: the charcoal marks which remain as your guide to minuter attention, may give you the unpleasant idea that your drawing will not look clear while they remain; but you will be relieved from this doubt, as soon as you have completed your second stage of study with the chalk, which (I advise) should be *the French*, or the softest of the two: now, although a light hand, and neat correct line, is always to be studied, you need not be alarmed at finding this second outline rather too black in some parts, because when you have rubbed the whole over lightly with crumb of bread, it clears away all the remaining marks of the

charcoal, and leaves this improved outline quite clear, and just visible enough to relieve you from the first degree of concern about contours, and proportions.

Now take the Italian chalk, and begin with the head, to draw, improve, and shade, according to your example. It is a good way to lay all your breadths of strongest shades first, and the more tender shades in succession, rather under their full depth, by regular strokes, forming masses, and increase their force by crossing them, in an *oblique direction, never directly* across, as that produces a very ungraceful effect.

Look to *good* examples, and practise with due attention, and a graceful *manner* will be the result. If you think *too* much of the arrangement of your strokes, you had better practise in this department of study upon the *most simple* subjects, until a good style of touch will flow naturally from your hand; because, a true imitation being your ultimate aim, the mind should be freed from all concern, in what may be termed *manual exercise,* before you undertake a work of much importance, which, *once attained,* the hand will never go wrong, but will obey the mind to the very boundaries of possibility.

The black chalk should never mix with the white, when used on coloured paper, because the colour is always a medium *between* black and white, and should be left clear as far as its tint answers the purpose.

The *stumps* may be useful in diffusing a breadth of shade to gain a speedy effect of back ground, or any other broad mass: take care that the use of them does not give you a *hasty manner.* The Italian chalk being very com-

pact, flows best from rather a firm *light touch*, than by pressing too hard: practice and attention will accomplish you in the proper use of it.

Always cut your chalk *from* the point, directly the contrary manner of cutting a black-lead pencil.

Crumb of bread is preferable to India-rubber, to clear off any error on this sort of paper.

I may now venture to hope that you will require no further instructions respecting the nature of chalks. Good examples may be of material service: there are very good academy figures, particularly as specimens of the use of the chalks, after Mr. West, sold at Colnaghi's, Cockspur-street, Charing-cross.

It would be presumptuous in me to depart from the sphere of my humble pretensions *(that of directing the hand)*, by borrowing the language of my predecessors and superiors, on the right formation of a painter's taste and judgment.

You will find the writings of Leonardo da Vinci, Algaotti, Du Fresnoy, Richardson, Sir Joshua Reynolds, Barry, Fuseli, Opie, Shee, &c. &c. most safe and certain guides. Were I not *thus ably* exonerated, I would rather *attempt* than suffer the incongruous fancies of youth and inexperience to proceed in error and uncertainty; and still my best shall not be wanting, in what appears to me to have been omitted, or, from its great importance, may be repeated to advantage.

Letter IX.

MADAM,

PERHAPS it may now be necessary to caution you against too much, or rather two long application at a time, until you are constitutionally habituated to the practice of the art: nothing can be more hurtful to the mind than *anxiety*. Ambition is often the parent of over-strained endeavour, eagerly wishing to attain the end, instead of a deliberate investigation of the means; which is generally repaid by disappointment.

Never suffer yourself to fall into this error; but study with a cool mind, and consider well the effect you ought to produce, having patience with the process, being anxious only in an inquiry after the *right means* of success. *This*, although according to the most *salutary* proceeding, will exhaust the faculties of *young* students, and should be *seasonably* relieved by *recreation*, *exercise*, and *refreshment*, but never to total neglect: the pencil should engage your entire attention some considerable part of *every day*.

The fine arts depending on an *ingenious power* of advancing directly against the general current of common propensities and depravities, cannot expect to proceed up such a stream, without vigilant exercise of *this power*. And no further relaxation is meant, than is sufficient to preserve it unimpared, which may be *properly* regulated by a prudent attention to your own constitution, and the general rules of health.

You desire to know my method of *finishing* black-lead pencil drawings: it is thus—I make my whole outline as

correct as possible, and then lay all the breadths of shade by tender hatchings or strokes, which I blend and soften a little with a *hard stump* made of writing paper: it is a very nice point gained, when you are able to make *this stump properly.* The *middle must* be rolled *close:* if there be the smallest hole up the centre, it will not answer the purpose. A thick card, cut to a point, is a good substitute.

I pay great attention to the model while stumping, so as to preserve all the lights, and leave the shades tender enough to require finishing with the pencil. This must be done with very compact lead: Brookman and Langdon's pencils, marked H H, are the most suited to *my practice.* I always draw on the best wove post paper, hot-pressed. The less rubbing out the *better,* in these minute works. If you choose to give up the smoothness of the paper, you may fix the penciling, by soaking it in *skim* milk, for a quarter of an hour; then *draw* it *carefully* out of the milk, and let it lay *aslant,* to dry *gradually,* moving it sometimes to prevent its sticking to the surface you dry it on: this must *not* be *hot* pressed again, as in that case the penciling will again be liable to rub out. You will find it require *practice* and *study* to make this information of much service. One cannot write a recipe for producing a *fine picture,* although it is easy enough to explain a process: (METHODS ARE LIKE KEYS, THEY SERVE TO OPEN DOORS, AND GO NO FURTHER). Be attentive, and have sufficient patience with yourself, and remember *your motto,* "*Perseverance.*"

Letter X.

MADAM,

WE as yet have only treated of copying, and of that little more than the outline, which, as you improve, will deserve to be finished with more permanent materials than *chalks* or *pencil*.

The most *common*, and perhaps the most useful of the water-colour class, is *Indian ink*—a fine deep black, which can be varied with water, through every degree of shade, till it falls imperceptibly into light: there is not any composition equal to it, for the general purpose of shading. It is *much counterfeited*, but may be detected. The *true China ink* will break to almost a polished surface, and is *moderately* scented with musk. The counterfeits generally overdo this; and others neglect it altogether. The true ink is the blackest when brought to a *deep* shade; but in the fainter shades inclines to *brown*. The counterfeits have more substance towards the deep shades than the genuine.

The *true*, preserves a greater degree of transparency than the other.

To use Indian ink conveniently, you should provide yourself with a slab of earthenware, or marble, with five dells, to hold the various tints: the largest is to contain pure water; and there is, generally, one long dell to rub the ink in: the other three are for three gradations of shade, which you should prepare with nice attention, making the quantity of each fully sufficient to serve throughout one season of your study. These three degrees

of shade, with the portion you first rub up (which should be as *strong* a black as the ink *can* produce), will give you four distinct shades; which, with that ingenuity requisite for a hope of success, you may, by *due practice,* adapt to all the shades attainable from this material; using *various sized camel-hair pencils,* according to the breadths you have to lay. The too common practice of putting the hair pencils into the mouth must arise from *absence of mind;* because so disagreeable and unwholesome a practice will not bear a thought—use *trying* paper to bring it to a proper point.

GENERAL RULES TO BE OBSERVED IN SHADING.

RULE 1.

The greatest distance in an *open scene,* with a *clear* sky, will always be the *palest.*

2.

The greatest distance, in an inclosed scene, will always be the *darkest.*

3.

The *nearest objects,* or those in the *foreground* of an open scene, will have the darkest shades.

4.

Objects in the foreground of an inclosed scene, such as the entrance of a cavern, or any other recess from the open light, will have the same degree of dark shade, as objects in the foreground of an entire open scene: because the dark distance, or back ground, is accidental, and will not effect them; although they will appear to have fainter shades than objects opposed to an open scene.

5.

To adapt the picture to the power and properties of the eye, you must, on all occasions, lay as tender, gradual, and *imperceptible* a shade as possible, at each corner of a square or oblong drawing, blending it sweetly off towards the point of sight, so as to give the surface *a concave appearance.* The same should be done towards the margin of a circular drawing; *always* securing this *natural concave effect,* before you commence your work on the detail of the absolute scenery; after which you may proceed in the same manner you would have done, had you not been aware of this optical operation.

6.

Always begin with the pale tint on the sky and distant masses of shade; and, as you approach the foreground, increase the depth of the tint, observing to be light enough at first.

7.

When you require additional strength of shade, do not take a darker tint for that purpose, but repeat the use of the original tint; strengthening the shades of all the various degrees of distance with its own tint, or the object will press too forward.

8.

Pay no attention to the reflected lights, which always fall on such parts as are out of the influence of the principal light, *when first laying on the broad masses of shade,* as the first lays should not be darker than those reflections: if this is properly observed, you will produce

all the reflected lights by your next process; that of increasing the shade of those parts which are entirely out of the influence of both light and reflection (in all their various degrees of distance); recollecting, that although no light falls on them, they must not be made darker than suits the distance in which they lay; because the law of the 1st rule given, remains in force. It is the intermediate atmospheric matter, and the decreasing power of sight, according to distance, which prevents your seeing such parts as dark as in the foreground.

9.

Your next regard must be to those shades where *light* and *particular reflection* are absent; but where some general reflection has influence enough to render the part lighter than those entirely devoid of either light or reflection. This, with rule 8, produces the reflections, by leaving them.

10.

Parts which are strongly reflected on by a *light mass*, are very deceiving to young copyists; they generally mistake such reflections for lights, and leave them much too strong. To prove the *great difference* between such parts as receive the pure light, and those which are only reflected on by the surface which receives its light from the first cause, make a cylinder of white card or paper, and lay one side towards the light, on a sheet of white paper, then raise the sheet of paper on the shaded side of the cylinder, till it makes the strongest reflection possible, on the shade side of it, and fix the sheet of paper up by a book, or the like, while you proceed on your experiment: you must then take

a card, or piece of smooth paper, the colour of the cylinder, and hold its surface in a line with the lightest part, at one end of the cylinder, and you will find them exactly alike; then keeping the surface of the card in the same direction, move it back to the shade side of the cylinder, and you will see, notwithstanding the force of the reflection, that it will be many degrees darker than the card, with which you conducted the light of the cylinder to this shaded side: take care to place the cylinder not quite parallel to the light, and make your experiment on that end which lays nearest to the window, or light.

11.

Transparent bodies have the strength of their shadows in exact proportion to their degrees of transparency, and are liable to as much reflection as their opaque parts will contain, as thus: the threads of fine muslin will receive reflection; but the reflection will of course pass through the *apertures* between each thread, which occasions the general effect of transparency, and in *that degree*, the reflected light will be weakened; but with thin paper, leaves of plants, and of flowers, there being no apertures, the reflection will be as strong as on opaque bodies; but not so distinguishable *as reflection*, on account of the transparency.

To be able to discriminate between reflection and transparency, according to their true properties, will be found a very great accomplishment, when engaged on such subjects as require it: it may be some source of refinement in your work, to be only *aware* of the distinction.

Transparent cylinders and globular bodies, such as the

stalks of some plants—the white currant, and grapes, receive a strong light through their bodies, which settles visible to our sight, on the convex or inner surface of that part, which, but for their transparency, would be found the darkest: this is often mistaken for reflection, and as often liable to the instruction given in the tenth rule; for, notwithstanding the rich glow seen on the remote side, the breadth of light on the originally illuminated surface must always govern in true degree, and will always contain a much superior light.

12.

Shadows of solid objects on level planes, are generally about the same degree of depth with the shade side of the object, except varied by some accidental reflection, (or difference of the local colour between the object, and the surface its shadow falls on); but this latter part of the exception must not be admitted under the head to which the rule is applicable, namely, *light* and *shadow, independent of colour;* but it being a necessary point of consideration, in distinguishing between shadow and colour, it may be of due service to have made the remark.

13.

Respecting objects as they appear in the open air, without immediate sunshine, observe, that although there will be one lightest side, yet the general influence of surrounding light, which is reflection, *may* render the shading (that is, the *breadths* of shade) very tender; however, sufficient force will not be wanting to make a good and natural effect, if the rules 8, 9, and 10, are truly followed: much experiment and observation must accompany them all.

P. S. Compare these rules with the effects you will find in good engravings after the best masters, particularly Claude, Lorraine, Rembrandt, and Teniers.

14.

White, as a *colour*, will be white in every part of your drawing; with the general exception of the influence of the 5th rule, and those parts of the white object which are in any degree overshadowed.

Letter XI.

MADAM,

IN the foregoing letter you have such general rules of light, shade, and reflection, as will tend towards forming the basis of sound criticism in your mind; and, as you now desire to study from statues, or what is termed "studying from the round," my next endeavour shall be to give you such information, as will accelerate your progress.

Let your first essay be to imitate a perfect sphere, or globe. Your model for this may be any plain globular form, the larger the better. You will perceive only one point of white, for light; and from that a tender gradation of increasing shade, till you arrive at that extreme of shade, where the light loses all power, except what is found from general reflection, or some particular reflection which may arise beyond this shade! If you make several studies from the globe, in different lights and distances, it will confirm an acquaintance with the rules I have before given you.

The best point of view that an object can be placed in, for the most harmonious relievo, is, when about "a quarter part of the whole is seen light, a quarter part dark, and the remaining half middle tint." This rule is given for whole pictures, as well as a single figure. You will find it improving enough to set your figures in various lights, till it agrees with the rule. Proceed to study, in every stage of your work, precisely according to the first information; with the additional help of the *rules* for shading. They, although given under the head of *Indian ink* shading, will be found a sure guide with any other material. Various circumstances may render it necessary to deviate from the above proportion of light, shade, and middle tint, 'which genius can only dictate;' taking due care to be fully convinced, when you depart from a rule, that it is an improvement according to REASON; *fancy* being too inconsiderate to assume this power.

Conviction, as to the most perfect effect, can only arise out of deliberate conclusions; and the artist who takes a sudden spring at "a grace beyond the reach of his knowledge," is as liable to disappointment, as a gamester who *risks his success on chance.*

Letter XII.

MADAM,

I SHALL accomplish a most important point if I succeed in explaining, clearly, the proper means of treat-

ing the *overshadowing* of *both light and shade*, as it is a subject requiring all your attention.

Suppose you set a figure fair to the light, according to the directions given for that purpose in my last letter, and finish a successful study from it. The table, you thus set your figure on, should be covered with white, and your back ground should be the same, as well as the figure, for this experiment; that light, shade, and reflection, may not be compounded with the various local colours of objects, which would otherwise, most probably, surround and affect it. Perhaps, when you *have made your drawing completely to the model*, you may imagine that a shadow over the lower part of it might improve the effect of the whole, as a picture; and so proceed, as *too many have*, to lay one *uniform tint* over the part thus appointed for shadow. But the truth cannot be produced by this transparent tint, for *it does not operate as a shade would*; it only changes the complexion of the part it covers; the original lights and shades all retaining their force proportionate to one another, precisely as the untinted parts: and you cannot produce the true overshadowed effect of any part of a drawing, or picture, which had been *previously finished to an unintercepted light*, by such a *trick*.

If you would proceed according to the truth, you must overshadow your *subject* at the commencement of your study, and follow all the changes of the effect produced by the circumstance. You will do well to study the difference of such effects, by experimental proofs, thus:— Set up some plain object, or a figure, and copy it completely as you see it; then *shade* over part of this copy with *one tint*, or according to what I shall henceforth

term the *false shade;* then, without moving the original object of your study, set up something which will cast as much shadow on it as your *false shade* pretends to have done on your first drawing. Copy this correctly, and then compare the overshadowed parts of both drawings with this last effect produced by your model, and you will have satisfactory proof why I termed the first a *false shade;* and, inasmuch as you become convinced of the error of such thoughtless dispatch, will your critical judgment be improved. You will then see one of the great causes of deficiency in the works of many of our contemporaries, whose eminence, in many other parts of painting, might vie with the painters of any age.

You should remark, that in *absolute shade,* or the *entire* absence of light and reflection, there could be no variety of light and shade; and whatever beauty and variety of folds, or articulations, may be found in the light, will almost suddenly discontinue, where *such* a shade meets them, and the shaded side would be a *flat breadth.* I have made this remark to an extreme that will *seldom* happen; but it is to warn you of the error of shading, and marking folds or muscles, &c. too distinctly; when *light,* which is the distinguishing power,—or *reflection,* which is its auxiliary, are *materially* absent: this you *should prove by experimental conviction,* which is absolutely necessary to your rightly comprehending the force of my advice.

Now to return to the *object* which I advised you to overshadow, observe, that the *absolute shades,* in the parts which are overshadowed, are no darker than they were *before* you overshadowed it, while all the originally light

parts are in the same degree as the power of the original light is prevented.

Whereas an *uniform tint*, such as I hope is proved to be a *false shade*, would increase the strength of the shades, in the same degree as it shaded the light parts: it could never produce the transposed effect of an overshadowed part, upon any drawing or painting *previously finished*, without having overshadowed your object at the commencement, for all such shades and reflections should begin and proceed with the whole work.

If the *overshadowed* muscular forms, folds, and articulations, were left as flat in a picture, both with regard to colour as well as shade, as they would positively appear in many overshadowed parts in nature, the beauty and force of the whole might prove, that much of the learned labour of some artists is employed to the disadvantage of his picture; for if all the *conspicuous parts* are to be strictly conformable to nature, with regard to light, shade, reflection, and colour, it follows (in my mind) that all the subordinate parts should be studied, through all their gradations, according with the same conformity, *as they would appear* when associated with the leading figures and circumstances of the same subject, and under the influence of the same li t, shade, and reflection; instead of which it too often happens, that after studying a model for the principal parts of a picture, the remainder is made out by unscientific recollections and suppositions, expecting to combine one great and pleasing effect without the mechanical drudgery of inquiring after radical causes through too great a conceit of competency. Allow me to warn you against this pernicious sort of self-

sufficiency, and to assure you that the beauty of your compositions may be robbed of half their worth, by substituting facts with unskilful ideas and harmonizing fancies.

(It would be an informing experiment *on the effects of the different degrees of light*, to separate the influences of the first and the second lights of the hemisphere, by a thin partition, of sufficient height and breadth, fixing one side directly towards the sun, and place a figure or object close enough to each side, that when the student takes a station at the edge of the partition, he may see both figures at one time; provided the reflections which might arise from the power of the sun, on the shade side, could be properly prevented. This might be practised on a small scale, by setting up a sheet of pasteboard (or the like) between two small figures; but it should be done in the *open air*, because the second, or reflected light, within a room, is too feeble; and the one figure would be too much in entire shade, instead of a second light.)

P. S. As you proceed on your study after the antique, you must cultivate the best acquaintance with their distinguished pre-eminence over all modern examples, for which I must refer you to critical application, and the highly-qualified pens of those authors I have mentioned in my eighth letter.

Letter XIII.

Madam,

With regard to the licences to be allowed in painting, I shall give you my opinion, as one not in doubt upon the subject.

Admitting, however, that an adventurer on new ground is liable to the investigation of others; but if such are only *speculative critics,* my opinion will remain unanswered.

Should philosophical *demonstration prove* me to be either *entirely* mistaken, or too confined in my observations, I shall not regret the result, because truth ought always to triumph over error; and I shall have this apology for what I advance, that my remarks arise from cool and deliberate experiment; and it is proper that you also should make them subjects of scientific investigation, that before you submit to me as a guide, on the *following points,* you may be clearly convinced of the soundness of my conclusions.

First, that absolute *dominion* which is the natural property of LIGHT, must on no consideration whatever be invaded by what is termed "poetical *licence.*" For truth cannot be advanced by false means; and as regarding the "*great style,*" or what may be considered the sublime, I believe "perfection" to be one of its principal constituents; and it surely must be admitted that *truth* is indispensable in the pursuit of it: still a painter's licence, or liberty, is amply sufficient for the successful accomplishment of the *possible* aims of genius.

The unbounded fields of imagination and invention,

history, poetry, and nature, are all dedicated to his use: he is at liberty to choose the most interesting subject, and introduce such an association of objects as may best suit his purpose; in doing which, should he commit himself to the censure of critics of this department, I leave the case between them, and abide by my subject; namely, a rational objection to the liberties taken with *light*.

After a painter has designed his whole subject to his satisfaction,—the liberty of *choosing freely* both scene and season as to *light*, and its operations and consequences, must be granted; *which, once determined*, and genius having hereby prescribed to herself laws, must throughout the whole work remain subject to them; and, notwithstanding the magical and harmonious powers of those who have succeeded in *rendering error pleasing*, still *light* and its consequences (*shade* and *reflection*) should never be tampered with, but on all occasions should be implicitly obeyed.

This may be sufficiently proved by modelling your subject, and placing it in a *suitable* light.

It is worthy serious attention, to consider how very different the light, shade, reflection, and colours of an object would appear in an open *landscape*, or on the clouds, or water, to what it must in an artist's painting room; yet how common it is for them to make the design, whatever be the intended scene, or back-ground, and then set figures, draperies, &c. to the light of a *small high window*; copying too faithfully to stand a chance of unity with (perhaps) the heavenly scene chosen for the subject. They do well who endeavour to remedy these unsociable circumstances, by placing such lights and colours round

about the object as may best tend to produce the desired effect: this insures a *certain degree* of concordance, which if they are happy enough to imitate, they will be amply rewarded for their obedience to THAT POWER which is superior to all controul, and its effects are as much above improvement as its cause surpasses the power of comprehension. Let it be recollected that there is no objection to a painter's choosing an appropriate light, or even lights, to paint *by (not to paint,* because he is not possessed of any material *light enough);* and modifying their powers and shades, by harmonizing reflections consonant to his idea of what is best adapted to his subject. It is his rebellion against, or inattention to, this *power,* after having placed himself under its dominion, which is the objectional point; in *which* should he persevere, his designs, compositions, and expressions, his contours, characters, and costumes, may be admirable; but his effect will be *wrong,* and as wanting in sublimity as of truth and unity.

There is always something pleasing, and often surprising, in a natural effect: the vulgar are delighted they know not why, while the accomplished connoisseur pays the willing tribute *of encomiums due to intrinsic merit.*

Reflection, and its effects, may be imitated: light cannot. It is a vain fancy, and an amusing delusion, to endeavour to represent that LIGHT which causes the lights and shades of the scene or subject of your study; such as a *moon*-light, *candle,* or *torch*-light; and, chiefly, the *sun* above the horizon.

When I consider what Claude, Rembrandt, Rubens, Vernet, Vanderneer, Schalken, Wright (of Derby), Turner, &c. &c. have attempted, and how completely they have

succeeded in gaining the *admiration* of the most professed connoisseurs; I should hesitate to advance the remarks proposed, although founded on, and derived from *truth*, were they not supported by the MORE SUCCESSFUL examples of the very SAME masters; insomuch as to embolden me to assure you, that much as the spirit of *such enterprize* may fascinate; a truly successful result can never be accomplished, while the powers of a painter are confined within the humble limits of WHITE and BLACK pigments.

Yet the works I have alluded to are charming!—they are captivating! Cool judgment is arrested by the glowing harmony of Claude, the vigour of Rembrandt, and the surprising effects produced by many other masters, on similar subjects. Should it be asked, Are their *effects true?* it may be answered by a question,—Who can exceed them? The answer to this may safely be—"No one can surpass what has been produced by those great men in this department;" but all this does not overturn my dogma, "It is an eagle's flight *towards* the moon," not *to* it.

It requires but little science to prove that *white* is not light, but it is an effect produced on a colourless object by light; and, if you go to the other extreme of the painter's gamut, you will find that the black is not the utmost depth of darkness, but only the greatest possible opposite to whiteness that can be produced on any substance, and between the limits of these MODERATE EXTREMES a sincere artist will confine his efforts, and never use the seductive art of gaining fame by *a splendid error*. I, however, readily submit to the licence necessary for

allegory, or symbolic painting: some intimation of light may often be found proper to the theme, and answer the painter's purpose completely as to the point of illustration, but very little further.

There is another great licence taken, which in my opinion is practised through a preference for gaiety rather than truth, which is the introducing *two opposite* effects in *one picture.*

I might here name many celebrated paintings, as examples; but my views are to excite an endeavour to remove errors, not to censure those from whom I must have learnt some of the little I know, notwithstanding my opinion in this particular.

We have often seen a picture representing the sun setting, or near that position, generally and judiciously kept by rich tinted clouds delightful to the eye: this, of itself, is as fine as genius and art could produce. But this fine effect is often opposed by *another:* a *portrait* or *group,* perhaps historical, or poetic, is introduced in the foreground; with a *broad* and *pure light* on the *parts towards us.*

Now it is to be considered that there is no power in the east, when the *only* sun we have is setting in the *west,* to enable a painter to produce the light which is *so often* found on what you will understand to be *this side* of his figures, when all the light there is in the hemisphere is fast retiring on the *other side:* whereas, notwithstanding the strong reflection which you may imagine from bright clouds in the east, the eastern side of all the objects in *such* a scene *must* and *would* be the darkest side. It has been argued, that by intercepting the western influence by a

wall, curtain, trunk, or branches of a tree, or the like, the eastern part of the hemisphere would convey sufficient light on the object; granted, if the western superior power be *entirely shut out*. But the smallest admission of the immediate and primitive cause of ALL the light which is in the whole hemisphere will in *truth* render all the opposite lights nothing more than reflection, and the *lights* produced by this reflection on *even a white object*, must be much darker than the sun-set tints in the back ground.

Some paint a portrait by a light above the angle of 45 degrees, and make some advance towards unity, by giving that sort of colouring to their back grounds, which the sun, near his setting, may give to the opposite part of the hemisphere: this certainly does suppose the figure and its back ground to receive their light from the same quarter; but it should be considered still, that the figure will tell you plainly (if well painted) that it received its light from a power 45 degrees above the horizon, when the background will at least "whisper" to the contrary: these jarring conversations in one party cannot be harmony.

Neither can I bring my reasoning power to allow, in painting, light as a *cause*, and its effect, both in one picture; with the *effect brighter* than the *cause*. I may here commit myself to the severity of all those who take excellence upon trust, and only look for a great name at the corner of a picture, to render candid investigation *almost* a sin: I have before objected, in general terms, to the introduction of any sort of *immediate* light, as a cause for any other lights in the same picture. "The flame of a candle, for instance, and the face of an old woman sup-

posed to be lighted by this candle," in so brilliant a manner, as to give the *flame* the effect of any light-coloured matter, rather than that which is introduced as the *sole cause* of all the light in the picture.

The glittering on water is often painted liable to critical exception. This at least requires thought.

Letter XIV.

MADAM,

I SHALL now beg your attention to the concluding observations on what belongs to the department of *mere* light and shade, or that which can be effected by black (in various degrees) on white; or black and white, on a middle tint, which in effect is the same.

The difference between the imitation of a white statue and a figure in colours, by the simple materials, black on white, requires the following thought. The first will only have the pure shades and reflections; the other must have an additional tint, equal in depth with the various local colours on the figure: this constitutes one great perfection in engraving; and where the engraver has a just eye to what *they term* colour, a surprising effect is produced: this requires nice attention and great practice. If you should choose to copy a few *very good* prints (perhaps after Woollett, Strange, and Bartolozzi), you will experience a proof of the advantage of comprehending this matter clearly, especially if you can compare them with the original painting.

It may be proper to caution you against too black a manner in shading; weighing the whole subject between

the two scales of black and white; and, although the corners of the fore-ground cannot (in obedience to optical economy, see Letter X. Rule 5) be light, they must never be so dark as to represent black, unless the objects are absolutely so, in their own local colour.

I have observed the works of some artists of acknowledged merit, wherein the *force of* shade was exhausted at too great a distance from the fore-ground; the consequence of which is, they are obliged to submit to a pale, tame fore-ground; perhaps persuading themselves (from a misconstruction of an observation made by Sir Joshua), " That nature, in her vast variety of changes and effects, *might* appear to sanction the circumstance." But light, and vision, have prescribed laws to the contrary; for it would *unexceptionably* happen, that if your whole scene were composed of colourless objects, their strongest shades would be in the foreground,—and, whether coloured or not, the radical law of light, and the effects of its *absence, must continue the same.*

The *deep* blackness of clouds, as a set-off to a portrait, *must* be absurd; for were you to add a black hat to the head, you would find a difficulty in procuring a shade strong enough to detach the cloud to its reasonable distance. I have no objection to dark back-grounds to heads, but I think BLACK AIR by DAY-light irreconcileable with reason.

Perhaps it may be well to repeat another remark respecting the darkness of objects in the fore-ground. It seldom happens in the open air, that any of the local colours of nature's productions are entirely black; yet we too often see fore-grounds so black, that a painter would

find great difficulty in introducing, and properly distinguishing, a black object on them: to guard against this error, paint or sketch a black object near the base line, as a kind of key note, to govern the local colour of other objects.

When you have either black or white to imitate, such as the local colour of drapery, you must consider that *black* drapery has its folds, and, consequently, shades, which can only be produced *with black*; you must, therefore, in conformity to the power of light, make the general colour considerably lighter than black, that you may be enabled to make out the forms you wish, by shading with *black*.

With regard to *white*, if you can have only white for the high lights of white drapery, you must, of course, lower the mass of white with a neutral clear greyish tint,* so as to preserve the whole according to the true effect of white drapery; as then it is in a state to receive those additional shadings, which *model* the form, the points of lace, or the hems of white drapery, and these only when the light is full on them, being all that can admit the touch of pure white.

It will be proper for you to habituate yourself to study after nature, entirely regardless of colour, till you find yourself familiar with the art of drawing, and the integrity of light, *shade*, and reflection; in the practice of which you will never have occasion to deviate from the principles of the few rules I have given you, as *radical*; and that in the strictest acceptation of the term, as the *fruits* of all you do must depend, on that general construction of system, which *true genius* only can define by practice.

Often call to mind and constantly practise according to

the instruction I have given you in my fifth letter, ensuring the *right situation* of every thing you would study, or you may use time and labour to no good purpose: consider how mortifying it would be to you, after having taken great pains, and finely succeeded in drawing some *considerable part* of a picture, to find it out of its proper place, or one part disproportionate to another.

It must be remembered, as your first consideration of colour, that all reflections are of a warmish hue; and all parts which retire obliquely from your eye, and from the light, are of a bluer, or colder hue, than the general shade: a careful attention to this in finishing drawings from plaster-of-Paris figures, or white marble, will add greatly to the effect—either in chalk, water, or oil; indeed, there should be no allowance made for different materials, a *true effect* being always required.

Letter XV.

MADAM,

I HOPE you are aware of the necessity of *practice*—the hand must be made familiarly acquainted with the part which a scientific mind will continually require it to act. How painful has it often been to me to see a pencil in the hand of an enlightened amateur, totally incapable

of obeying the dictates of refined taste and first-rate judgment for want of this.

Nothing can be produced without the equal union of the mental and mechanical means.

As your knowledge increases, let your practice improve.

Decide on what is proper to be the subjects of your study from the most beautiful and interesting productions of Nature and Art, and acquire a certainty of hand by deliberate attention to the natural properties of each *individual* object: this will prevent that sort of conclusion which is the parent of 'MANNER.' Let every thing have its own *peculiarity*, that there may be no *room for your's*, and endeavour to make it appear that *Nature made the picture*. This will require all your powers, fully disciplined; and be assured, any hasty advance without them, presents no better a figure to my imagination than a "blind man running a race."

I may reasonably hope you will govern your progress, by advancing with collected deliberation, that you may not have occasion to retreat for want of assistance.

The memory is an inexhaustible resource; it may, however, be a fair excuse with some to plead a bad memory, and it would not only be too severe, but untrue to say, all have equal powers to cultivate and improve their natural faculties so as to become qualified to perform works of distinguished merit. Yet the memory is too often blamed for suffering that to have escaped her, which in truth she was never properly put in possession of.

And how vainly the idle take shelter under a very pretty conclusion of "Pope's," that

> "Where Beams of *warm imagination play,*
> "The *Memory's* soft figures melt away."

There is a degree of impiety in pleading a want of faculties, when the real want is proper industry to make right use of them. The *well received* materials most proper for the furniture of the memory, may be compared with the *well-disciplined* reserve of an army, which, although unemployed while the powers appointed are action, do not retreat or "melt away," but are ever ready to advance to their object, and are therefore, alike, unfairly censured as deficient, because unemployed.

Those who are blessed with clear intellects, and with the virtue of cultivating the knowledge requisite to their particular pursuit, will not have occasion to accuse their memories, but will readily refer to each element as occasion may demand their aid.

> Let then the *Memory* be *well supplied,*
> As nought can flow where nothing swells the tide!

Some allow themselves to imagine it good to undertake great and difficult works, as stimulatives to investigation; I must compare such, to "one who jumps into the sea, that he may be under the necessity of trying to swim;" or who launches out on a voyage, without the theory of navigation and the requisites for such an undertaking.

I knew a country *builder*, who began a house on a considerable scale, and when he was asked his plan of the whole, he answered, "I cannot tell how to settle so much in my mind at once, we shall see how to dispose of matters as we go on." This may succeed with a certain singularity of genius, but must not be considered a *proper system*.

I have ventured these *trite* comparisons, on points of the *utmost consequence*, with a view to fix them on your memory, by their singularity, for it is the height of absurdity to begin a work unless you know how you should proceed.

Besides those books I have referred you to, for the accomplishment of your *mind* as a painter, you will find it absolutely necessary to have a good Treatise on the Grecian Orders of Architecture. I think Mr. P. Nicholson's work in 3 vols. octavo, on this subject, completely adapted to your purpose; as his explanations of the projection of shadows will give you great improvement.

The Dialogues I have given on Perspective, *may* be all you will require on that subject. Should you feel inclination, or occasion, for further knowledge, Malton (senr.)'s is a *complete body* of the science, both in theory and example. Mr. P. Nicholson's also, will probably be a very scientific treatise on the subject (judging fairly by what this accomplished author on perspective has already given to the world in the Encyclopedia, and his own Architectural Dictionary). The *Jesuit's Perspective*, and Kerby's Doctor Brook Taylor's, are also good, and will not only confirm you in the science, but convince you of the truth of my Introduction.

We shall next ascend to the study of colours; but I cannot encourage you to advance till you feel yourself sufficiently conversant in the knowledge and reason, for both the *natural, geometrical,* and *perspective forms of objects,* not only as regards their shape or outline, but also their *shades* and *reflections,* according with the peculiar influence of *the light and distance,* in which they present themselves to your eye, which, the more you understand, the greater will be your qualification to proceed.

END OF THE FIRST PART.

ON COLOURS.

Letter XVI.

MADAM,

THERE are many treatises on using paint, which may help you to mix your tints with readiness, and assist in the enlargement of your stock of knowledge, perhaps more than in the usefulness of it. If what I shall communicate on the subject should help to form your judgment, so that you may take a scientific view of those systems, and decide for yourself respecting their utility, I shall have succeeded to my utmost wish.

There are but THREE (PRIMITIVE) COLOURS—RED, YELLOW, and BLUE—which, by mixing half of each two colours together, will produce *three more—purple, orange*, and *green*: these are also considered COLOURS, but it must be recollected they are not PRIMITIVE, being *produced* by *mixture*, and incapable of producing *any* tint but what must be a further remove from the purity and brilliancy of the *primitive*.

A proper quantity of each of the three first colours will compose BLACK (by the mutual destruction of each other's power) when mixed; which, notwithstanding the

PLATE XVII.

FIG. 1.

all Red

all Yellow

all Blue

Neutral

all Neutral

The colours of the Rainbow produced by motion on the Center

FIG. 2.

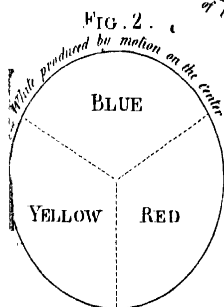


FIG. 3.

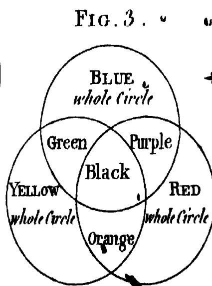
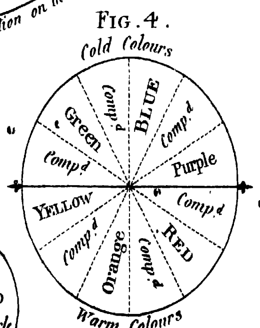


FIG. 4.



Hayter Invt

Turnbull Sc.

prismatic conclusions to the contrary, must, in my opinion, be admitted by PAINTERS, as their *seventh material*, or colour; which, with the six before mentioned, by properly applying separately, or variously mixing and tempering to the light or shade required, all the gradations of colour to be found in nature (between black and white) may be truly imitated.

The first great proof of the purity and seniority of the three *radical* or *primitive colours* is, that they cannot possibly be re-produced by any compound of their own.

The second sign of their originality is, that, although a *palpable* mixture of the three will produce *black*, an *impalpable* mixture will produce *white*, which can be proved by dividing the area of a circle (Plate XVII. Fig. 2), into three equal * portions, by right lines from the centre to the circumferent line, and colour each portion of the circle, thus divided, with one of the *primitive colours*, each of *equal depth* of tint. The top of a whipping or humming-top, is an excellent means of working this problem, for on spinning one *thus coloured*, the appearance will be nearly WHITE.

The *Iris* might have been mentioned as the first and greatest evidence of the super-eminent powers of the THREE *principal* colours, as they evidently produce all the others, by graduating and mixing in various degrees of either one or the other of the *three*, in the spaces

* Sir Isaac Newton has divided the iris into 360 equal parts: giving *Red* 45 parts, *Orange* 27, *Yellow* 48, *Green* 60, *Blue* 60, *Indigo* 40, *and Violet* 80 parts. My diagram is divided *equally*, for the purpose of an easy experiment to young students.

between them, and on the outside extremities of both the red and the blue, by vanishing into the neutral. To prove this, draw the following figure, on a large sheet of card, (Plate XVII. Fig. 1.) Make first the largest circle the card will admit; and another, at about three inches distance, so much nearer the centre, and divide this space into nineteen equal parts. The circle must be divided into twenty-four equal parts, by right lines from the centre to the circumference: by these divisions you will have a geometrical guide to draw zigzag lines, as boundaries for the *three colours*, taking care to leave a fifth part on the middle space for each colour uncrossed, that each colour may show itself pure, as in the diagram given for your guide. The reason for making the spaces for the three colours in this *zigzag form*, is, that thereby they intersect or mix with each other, *when put in very* QUICK *motion on its centre*, and produce the green and orange tints on each side the yellow; and the red will descend into the neutral by a purple tint, which will sufficiently appear on experiment: the centre, and outer part of this diagram, must be neutral colour. The whole should be drawn with *pencil only*, that the lines may be rubbed away after it is coloured, as ink lines would destroy much of the effect when the experiment is made.

You may try another experiment in proof of the superior qualities of red, yellow, and blue, over all other colours, (Plate XVII. Fig. 3.) *This scheme* is my own:— First draw a circle: then, with the same opening of the compasses, set one foot on the circumferent line, and draw a second circle; and again, with one foot of the compasses on the point where the two circles bisect, draw a

third; cover one whole circle with yellow, another red, and the other with blue (letting each dry before you lay the next); the colours intermixing by the equilateral intersection of the three circles, will produce green, orange, and purple; and the centre portion, taking all the three colours, will be neutral of the black class, and nearly black, according to the strength of the three separate lays of the primitive colours. By this diagram you will have a certain proof of the colours which are most adapted to oppose each other, from which the knowledge of their harmonizing properties may be derived. You will find a primitive colour always opposite to a compound one; as, BLUE will be opposite *orange*, RED opposite *green*, and YELLOW opposite *purple*.

If you strike a circle, Plate XVII. Fig. 4, and divide it into twelve equal portions, by drawing lines from the centre to the circumference, you will have a very full scale of gradations, laying the three first COLOURS at equilateral distances, and the three first *mixtures* in the intermediate spaces: then fill the remaining divisions by tints, composed equally of those two colours which you find on each side the space. Thus you have a *regular compass* of all the major colours and tints, whereby you may see their dependence on one another, as also the gradations by which they become opposite in their qualities of tone.

The radical properties of the three primitive colours are confirmed by this established fact, that they mix in the *same order*, in the compounds of palpable colours, as in the iris, through all the gradations of any two together.

It is almost impossible to carry instruction beyond the basis laid down in this diagram, without a risk

of confining *a diffident* student within a system; but as one *general instance* may awaken the right mode of inquiry, I shall advance it: thus, either of the three principal colours, will stand forward in a picture, by being opposed by compounds of the other two, agreeable to the order they are found in the third and fourth diagram; and when either black or white are required to form the principal mass in a picture, they may be supported, or held conspicuous, by subordinate masses of all the three colours, ingeniously and naturally arranged; either pure and separate, or compounded, agreeable to the light, shade, reflection, and distance, of the object on which they are found, as local.

From the certainty of what has been advanced, it appears reasonable that those who use colours without a scientific conformity to, or even an apprehension of *a system*, must depend solely on the harmony of the eye, knowing and feeling that when they are right, but unacquainted with that which would insure them against a risk of the contrary.

It may be asked, if such is the extensive power of THREE COLOURS only, why are we furnished with such a great variety of paints? The answer to this question, satisfactorily, would give the inquirer some considerable study. "The book which explains the nature of *substances used in painting*," is sold at Taylor's *Architectural* Library, Holborn.

It may suffice if I give the general information on the subject as a general answer.

The three substances (except ultramarine) which produce the primitive colours, and mix so prolific to all tints whatsoever, are not so strong and durable (when mixed), as

many natural and artificial productions of different colours; these, therefore, are preferred, both as to their strength, and as they save the trouble of compounding. Another great reason is, the inferior colours are cheaper than the primitive.

It will be worth the study, if you inquire attentively into the nature of your materials, by the means above referred to, or as much deeper into the art of chemistry as may suit your taste for such study; as the compass of my undertaking will not admit of room to launch into all the information necessary for an accomplished artist; besides, where a book is already extant, *equal to the purpose,* I fulfil my engagement by directing you *how to obtain it;* for it would require a complete Encyclopedia of Art, to bring all that is requisite on the subject into one book.

Letter XVII.

MADAM,

THEORY can only show the entrance to that vast and varied field of the art which comes under the dominion of colour; or perhaps point out some few of the main roads which are most likely to forward the student on his way towards the attainment of a rational system.

To paint in water-colours, you must begin by shading or modelling the whole with a *neutral tint,* composed of indigo and Indian red, which produce a charming, cool, retiring colour; more generally adapted to receive the various local colours than any other.

Whatever you can conceive to be in any degree shadow may be done with this tint, not regarding the colour of the object; and using this neutral tint only, as the proper *representative* of shade, which, you understand, means all the various degrees of the absence of light, independent of the additional force or depth which the local colour must give when added: this will be sufficient caution to you against doing too much of the picture with this tint; for, when the effect of a colourless object is produced, with all its proper force of light and shade (such as a finished white marble statue), this neutral tint has completed its part, except as a *local tint*, it may often suit the colour as well as the form; as in clouds, water, and distance, which makes it superior to Indian ink for the purpose of dead colouring, as this first lay may be termed.

The method of preparing and using this tint is precisely according with the direction given you for shading with Indian ink,—see Letter X. Now, as the instruction for adding the various colours of each object in the picture, and also the general hue or tone of it, must depend on circumstances, I can only proceed to general information, which, if properly digested by practice and observation, will, I hope, introduce you to a good system of reflection, and lead you towards a true imitation of nature.

The first general distinction of colours, is by dividing the circular diagram, which might not improperly be named the "*painter's compass,*" as explained in the sixteenth letter (Plate XVII. Fig. 4), into two equal parts, upon that line which includes the yellow and excludes the purple. And you will find all the *warm* colours on the red and yellow half of the "*compass,*" and the *cold* on the other.

The warm colours are adapted to advance, and the cold are considered as retiring colours, yet they all will suit a forward position, when pure, and properly supported according to the illustration of the fourth diagram, page 164, but will retire in *various* degrees towards the distant ground, when used pale on the neutral tint, suited to the intended distance; and in *oil*, by mixing white and neutral enough to carry the colour off. This will be confined to flat surfaces only, in a due degree of light, without glittering or reflection, producing this general rule,—That the greatest warmth or evidence of local colour will always be found on the illuminated side of the object; and, as far as a general rule can accompany genius, in views of natural scenery, you will find that when looking *towards the light* (as for instance a sun-setting effect), the distance, and sky, will possess most of the gaiety and warmth of your pallet, with all the *light* possible; and the fore-ground will be cool and sedate, and advance with increase of shade, owing to the shady side of all objects being towards you; and in all broad masses, which lay entirely out of the immediate influence of the principal light, this will be *strictly* the case, on account of the cool, secondary light of the opposite part of the hemisphere.

It will be impossible to tell you what gradation of tints will best accomplish such and such effects, owing to the rapid changes of the cause: for *yellow* changes quickly to *orange*, and *will* become *pink*; and then *purple*, in a short space of time deepening into indigo, on to the total absence of all idea of colour: this gradation will be found on the *edges of clouds*, according to their apparent distance from, and strength of the CAUSE of the light on them; and the plain atmosphere, or *space* seen behind such clouds,

will graduate from colourless brightness near the horizon, to yellow, then pale green, on to blue, till it falls in with the indigo, and, like the gradation just mentioned, will at last retire upwards into colourless shade, as night advances; so that the mass of *space*, or plain sky, will derive its colours and gradations of them, from the horizon to the zenith, according to the arrangement found in the *blue half* of the rainbow; and the *clouds* will be illuminated with the colours of the *red* half, including half the centre or yellow portion; in both instances,—beginning with yellow on the horizon, and ascending gradually to the deepest colour of each extreme of the bow, as under.

The Colours as they appear in the Rainbow.

Purple, | ***Red,*** | ***Orange,*** | ***Yellow,*** | ***Green,*** | ***Blue,*** | ***Indigo.***

Colours of the lighted parts of clouds at sun-set.	**Gradation of the colours on the space or clear atmosphere.**

Zenith, or Top of the Picture.

	Purple,	**Indigo,**	
Colours of the lights on the clouds, as correspondent with the warm half of the iris.	**Red,**	**Blue,**	**Gradations of the colour of the sky, as correspondent with the cold half of the iris.**
	Orange,	**Green,**	
	Yellow.	**Yellow.**	

Horizon.

Let it be recollected that this systematic association of colours, can only be found under *one particular circumstance of light* and *aërial medium combined;* and is given as a theme of study in the department of radical research, under the full conviction, that the more that *causes* can be as-

certained by *such* as are possessed of *adequate talent*, the more free and powerful will their effects be displayed.

I shall therefore advance my further observations on systematic effects of light, aspect, and consequent colour, as they appear to rest on any practical basis, from which genius may take flight upwards with *some* increase of certainty, that there is way towards the radiant realms of perfection, without groping through chaos.

Permit me now to call your attention to the effect which would present itself to your study, by turning you back towards the sun; then you will find the greatest distance to be the coolest; and every object will brighten as it approaches the foreground, and will have their local colours heightened by the power of the light directly on them, exhibiting all the spirit and warmth of colour, as well as strength of shade, on the nearest objects, according strictly with the rule I have just before given. You must recollect what has been said on the subject of light, shade, and reflection, as they are *general rules*, and must bear their parts as much in a painting as in a mere drawing without colour. You must also conclude it reasonable, and will prove it in nature, that as the two contrary effects I have noticed, arise from a direct contrariety of cause; any view to the right or left of either the one or the other, will have their warm and bright parts opposite the light, and the shades, in quantity and tone, proportionate to the degrees *of its absence*, and the angle it makes to the light.

With regard to the particular colours proper to each part of your scene under those aspects, the circumstance *alone* can dictate: if the objects are free from moisture, you will have much more of their local colour than when wet with dew or rain, because moisture gives a glassy surface,

which returns reflections of the sky, &c. to your eye, instead of the colour of the object. Therefore, in an effect looking towards sun-setting with a *wet landscape*, you will find the colours of the sky reflected strongly on the various distances, according with the angle under which they come. The most distant, would almost assume the colours of the sky nearest the horizon; and as your eye would advance to nearer objects, the reflection of clouds or sky, at an equal angle with that which your ray of sight would make on the surface of them, would give *their* colour instead of the local (see Dialogue on Reflection, page 83, sixth line from the bottom), and consequently would be colder, and increasing darker, until you arrive at the base line of the picture; the absolute glitterings of wet excepted. The effect you would have when viewing the opposite aspect, under the same circumstances of wetness, would (as I have observed) render the distance much lighter than in a dry landscape, which I conclude is owing to the power of the light returned by glittering; and although the colouring would advance towards the foreground, with a due degree of general warmth and increase of local colour, yet the moisture would have that cooling influence which the incidental clouds would convey, at their proper angle of reflections.

The remarks I have made are rather to lead you into a proper train of observation when studying nature, than a presumption to give a law for colouring without. To become an accomplished imitator of the beauty and harmony of the natural effects of colour; you will find it proper to apply, frequently and studiously, to every picturesque circumstance, which may tend to the improvement of your powers. The various *seasons of the year*,

and times of the day—the storm, and calm—all have their characteristic beauties and peculiarities, of equal importance in the choice of a subject, and on which a whole picture most materially depends for that unity of effect, which no theory can explain, beyond the general scientific principles of the correspondence between causes and their effects.

Letter XVIII.

MADAM,

I HAVE hitherto treated of drawing (or outline), light, shade, reflection, and colour, *separately*, for the sake of progression, that you may be the better enabled to collect the whole under one idea—*that of complete picture.*

The *outside line*, correctly understood, is a most important point to accomplish; and light, shade, and reflection, are only the general continuation of it.

What the *outside* line, is to the apparent extreme edge of the object, lights and shades are to all the parts which lay between them; evincing, by their judiciously arranged degrees of force or tenderness, all the projections or recedings as perfectly as the *outside* line, *insomuch*, that a sculptor might make a *perfect model therefrom*; and thereby proving, that the outline of the whole of every part, is as necessary to be conceived and expressed as the *outside* line,—and, if perfectly accomplished by the com-

bined truth of the means, an universal outline will be as evident as in the complete statue, or model, which it ought to be correct enough to produce; and the *local colour* must so *unite* with all other circumstances of colour, reflection, &c. in *this*, as rather to *improve* the effect than confuse it.

I may surely venture to hope that what I have communicated (of each part in its place), will assist you in the pursuit of your studies, and lead you to seek a *good reason* for all the effects you would attempt: when I say *good reason*, I wish you to understand that the *name* only of the greatest master may not be sufficient reason for you to copy him. If you are asked why you oppose purple to yellow, I hope you will have a much more scientific answer than saying, "Because Vandyke did so." Although it will be proper to caution you against doubting, while you do not possess the science requisite, rather inquire why they did so or so? to obtain the same good reason for copying them, which they had for copying nature to that perfection some few have attained.

To say more on the combination of all the separate parts or means by which the whole may be best produced, would be *binding* you to that systematic foundation on, and from which, genius *should rise* with certainty. Look to *nature* with the eye of *art*, or you can never hope to imitate her beauties.

P. S. In answer to your query, respecting profiles: Persons who think their *profile outline* to be irregular or overmarked, have a great objection to having their portraits thus painted, thinking that a front view may give a more favourable picture, which you must perceive cannot be a

true one, if the profile projections are not quite as evident in the front view as when you see it in a direct profile: to prove this, study the bust of our noble hero Wellington. What point of view could soften or take off the evidence of his having strong-marked features, if all the parts and articulations of the other forms of the face, as seen in the model, were strictly attended to? You may take it for granted, that the above prejudice originates, and belongs to *black-shade profiles only;* and for my own judgment, I must declare, I conceive that strong-marked features, *viewed in* front, especially under a proper angle of light and shade, may produce a less pleasing effect than profile; particularly in female faces, in consequence of the *bold shadows* of their projections, while the profile may be so placed, *broad to the light,* as to render the effect as agreeable as the form could possibly admit. However, I only offer my particular opinion on this, as a theme rather than a law; and trust you will cultivate acquaintance with those ideas which will give you satisfactory decision in all you do.

Many ask a portrait painter why he paints with so high and confined a light, and that only from *one* window, or aperture: it is, by its *height,* intended to give a sufficient quantity of shadow, to produce not only a more practical, but powerful effect in the object of study. And why but *one* window? because integrity of light and of shadow, is not only more substantial in effect, but much less difficult to imitate. For an experimental proof—set a decanter of water on the table, and study it from a *painter's light,* and the operation would be as simple, and as perfect, as the nature of the object would admit. Then open two or more windows, in

addition to the painting window, and try another study from the decenter; and you would find such a multiplication of lights, shades, and reflections, as to increase the labour proportionate to the number of windows: and after all, it would *only be the picture of the decanter,* with no improvement of effect for your trouble.

Here observe as a *lesson,* that the depth of shadow so necessary to the best effect, must be studied with the *nicest attention to nature,* as (perhaps I may say) ninety-nine out of a hundred fail in the advantage offered them by an appropriate situation of their model, through incorrectness of shade and colour, and *that* which should appear one of the greatest merits of their work, becomes the ridicule of the vulgar, as well as a just object of criticism to the connoiseur.

ON MINIATURE PAINTING.

Letter XIX.

MADAM,

I SHALL now give you the copies I promised of the two letters I wrote to my much-respected friend, Miss W., on the subject of miniature painting; in which you must submit to some repetition of many points, with which my foregoing communications must have made you thoroughly acquainted. I have sometimes thought of abridging them of what they contain of matters previously explained; but have concluded that it will be more to the purpose to repeat the whole as originally written, with a design of giving my system as complete as possible.

A very *tolerable* painting in miniature has been produced by an amateur from an attentive application to the following letters, who had *never before* used a *colour*, and in the specimen alluded to, had no other guide than a black and white print.

Instructions on Painting in Miniature,

IN LETTRS TO MISS W.

"MADAM,—I consider it due to your great attention, and the honour you have done me by your improvement, to give you this general memorandum of the whole process, that you may not be at a loss in any material point when you will have finished your course of lessons, and can practise without a master.

"The sheet ivory for miniature painting is to be had at most of the water-colour shops, and of ivory turners: the best for the purpose is clear, free from seams and *white marks* (somewhat like what is called a mackarel sky): they can be had any size within the diameter of an elephant's tooth. It is best to bleach the sheets, gradually, for a month, in the sun: some boil them. They may be brought to a good state to paint on, in half an hour, by placing them at a small distance from the fire. When a sheet of ivory is sufficiently white, it will become in a certain degree opaque, losing that *oily transparency* which is its natural property. You must then scrape it, with a sharp *smooth*-edged knife or scraper, till the saw marks are cleared off, and the surface perfectly smooth. Rub it with cuttle-fish till the polish is flattened, and, with

a large pencil-full of clear water, wash the surface, and wipe it off quickly with a very clean piece of linen or cotton: or rubbing it with very clean India-rubber will answer the purpose: it is then fit to paint on. Take great care not to touch the surface afterwards with your fingers, as it might possibly impede the work, by rendering the part you touch (perhaps) in some degree greasy. Even the imperceptible perspiration of the cleanest hand must come under this character, and the caution must be strictly observed, for *no other reason* than the one given, although an ill compliment to *such a hand* as I am endeavouring to guide. When your ivory is prepared, cut a card, about one inch longer and wider, to put it on, which you may fix in a temporary manner, thus: — Lay the ivory even on the card; make a pencil mark at each end of it; and then cut four teeth, or angular points, in the form of a V, at the *corners near the* ends of this pencil mark, quite through the card, pointing inwards, and finishing at the pencil line. Slide the ivory under these four points of the card, and that will hold it secure till you have made your drawing, which should be done on a piece of wove paper, the size of the ivory. I generally lay it over the ivory, by sliding it under the same teeth which holds it to the card,—it is thus secure enough to sketch on.

" If you only wish to draw a bust or head, divide the length of the ivory into three equal parts, and let the length of the head be one of those parts; and, to a person of middling stature, place the chin or bottom of the face in the centre: this gives half a head clear above the head, and the length of a head and one-half below, which you will find to fill your ivory very proportionately, being careful to place the chin higher or lower on the drawing, according to the stature

of your subject, observing that it *is always* wrong to have the face too *low down*. One-eighth part of the length of the head, either above or below the centre, is nearly sufficient for the tallest or shortest person; that is, one 24th part of your ivory: *discretionary* liberty must be granted in this.

" When you have made a *correct* drawing on the paper, and *completely settled* your composition in pencil, *marked strongly*, raise the corners of the card, and place the drawing under the ivory, which will serve as an outline for your painting, as the ivory will be transparent enough for that purpose. Here you will have an advantage you would not have had, if your first sketch had been made on the ivory—that of moving the paper drawing to that part of the ivory you may wish; if, by incaution, you may not have begun in the centre.

" To obtain the proper *handling* in miniature, it will be good practice to copy in Indian ink, a few of the *very best* engravings after some noble and worthy reputed characters, that you may not be perplexed with colours till you can feel your ivory ground; and as soon as that is acquired, you may begin painting; but I should not advise studying from the life, until you have made some copies after the best paintings you can procure; and by all means, let them be a *life*-size, after *only good paintings*, as copying miniatures will give you a *little style*, especially as there are very few of much value, except as to identity of resemblance; and as to manner of putting *on the paint*, it is only worthy your attention to know that it should be done with great care and delicacy, which practice and conviction of *what you have to do* will best produce. It may be proper now to assure you, that there should be but *one* distinction

between large and small pictures, namely, "*the difference of their* size;" to prove which I have only to refer you to Mr. Bone's enamels after *large pictures:* they are the *finest miniatures* we can conceive; and if more is necessary to be advanced in proof of this, as far as regards the *size* of a picture, I will ask what small original pictures, "generally considered," are to be compared with the engravings (after some of the largest pictures in the world) by Sir R. Strange, Bartolozzi, Woollett, Sharp, Heath, Cardon, &c. &c. which, *for size,* must be classed with miniatures?—Teniers, Ostade, Wouvermann, Rottenhammer, Wilkie, &c. prove, that the small dimensions of a work ought not to lessen its importance; for a good miniature must contain all that a good life-size picture should, except *quantity,* which I hope will settle your mind as to *style,* that you may proceed to the *manner* by which a good miniature may be produced—if you can compose and *draw equal to such an undertaking.*

"It would be uncandid in me to proceed, without assuring you that all I can teach you, respecting the progress of miniature painting, will not enable you to produce a good picture, in any degree beyond your abilities for *correct drawing.* There is no power in colours to render *bad drawing* pleasing; it must not only be well drawn, but well characterised; and a competent knowledge of the reasons for light, shades, and reflection, united with a happy taste to arrange the whole to the greatest advantage. It is not imagined that these accomplishments will shine out in perfect splendor in your first essay, but they must ever be the ruling principle of your progress. The mind must be bent on perfection, and you must not turn your beginnings off with disgust, continually entering

on something new; but studiously and patiently correct and complete whatever you begin to the very best of your abilities, which must not depend on your BEST WISHES for a *lucky hit*; but *acquired ability*, through elementary application, whereon alone *certainty* depends. Please to understand, my objection to your making many beginnings, at once, does *not* extend to your *sketch* book, which may not improperly be classed with the accountant's *waste book*, wherein you should not neglect to sketch any thought, or circumstance, worthy a second consideration. Your sketch book will be the sincerest critic; showing what you can do, and proving wherein you are deficient, thereby directing you in the clearest manner to which of the elements you should apply for improvement.

" *Now* ADMITTING *you qualified*, use fresh soft water, and the gum water should also be fresh, and the finest water-colour cakes you can purchase may be much improved by re-grinding, for which you should be provided with a glass slab, and muller, or levigator. Rub the cake on the glass slab with *thin* gum water, till you have discharged as much colour from it as you choose; then grind it with the muller for ten minutes (the strong bodied paints will require more grinding than the lakes); take the colours off the slab with a pallet knife, and place them on your pallet in the following order, or any other you may choose to adopt with better reason:

Brown madder lake.	Pink ditto.	Carmine-lake.	Vermillion.	Light red.	Indian red.
Sippia.	Vandyke brown.	Burnt terra de sienna.	Raw ditto.	Gamboge.	Yellow ochre.
Nap. Yell.	Black.	White.	Ultramarine.	Pruss. blue.	Indigo.

"Begin your painting on the ivory with the utmost attention to correctness, not entirely relying on the sketch you have behind; but reviewing and improving the whole to a perfect likeness in this new outline, by tender touches and masses of shadow: do not work too wet, but bring the whole forward by *hatching*, which is making light clear strokes with the pencil, somewhat in the manner of line engraving; and *stippling*, which is dotting, and is generally practised most towards the finish of the work. You must never let the pencil *stop* on the ivory unless you would leave a solid spot of paint, which is seldom required. This is to be done with a neutral tint, mixed of Indian red and indigo; but for *flesh*, ultramarine blue, and the madder lakes, will be finer. You may draw and paint with this tint, till the whole of that which you can consider shade is completed, paying very little attention to the local colour or complexion of any part, but aim at the effect of a plaster-of-Paris bust; observing, as you proceed, that the reflected parts may have a thin warm tint of yellowish hue: *raw* terra de sienna is a good *general* colour for this. This must be done with the eye to nature, and a hand of caution; and all retiring parts, or those surfaces which are seen in an oblique direction, will be colder than the other parts of the shading; that is to say, bluer, when you have the light side of your subject *towards* you.

"The neutral tint is a retiring colour: take care to use it sparingly and tenderly, recollecting that the local colour added will decrease the light in a considerable degree. In marking the forms of features and muscles, the neutral tint should have more of red than blue, especially the lips; for, if you model too much with a *cold tint*, you will not recover

the coral of the lips. The nose and ears, being transparent, will in *some points* of *light* have their shadows of a deep red: this depends on the circumstances of light and reflection, by which you must be directed.

" As soon as you have produced a good likeness, as to dead colouring, begin to cover the whole with the complexion, both lights and shades, proceeding in a careful tender manner: you will find light red, pink madder, well-ground vermillion, and raw terra de sienna, equal to almost all the local complexion you can conceive, when variously applied as your subject dictates.

" In very fair complexions the ultramarine will be found necessary near the inner corners of the eyes, on the sides of the nose, on the temples, and about the mouth, and in all *retiring* parts that are not under the influence of reflection.

" Indian red (when fine) is a very useful and durable colour, but, like vermillion, requires a delicate touch, it being an embodied heavy colour, and should be used with very little gum. Now begin to find your deeper shades with a mixture of Indian-red, lake, and Indian-ink, attending at the same time to brown or warm shade, and increase the local colour, especially the darkest or deepest, and settle all your high lights by delicate touches of " fine white," as prepared from " Hume's, of Long Acre," and to be had at most of the colour shops, ready for use like the other cakes of colour. Observe to keep and use this colour very clean, and indeed all of them: use the purest water you can obtain, and have a little thin clear gum, rather using too little than too much, as it is liable to injury from damp. I have habituated myself to forward the

back ground and draperies immediately after this *first stage* of the likeness, or subject, is in a *satisfactory* state, which you will understand to be when *the whole appears* tolerably correct as to design, light, and shade, but faint, like a very pale impression of a slightly coloured print.

"When you have completed your design, the ivory may be easily cut to a proper size and shape with scissors, beginning at the sides, and cutting *with* the grain towards the ends; then gum the *back* near enough the edge to prevent it from running under the flesh, as that would give a cold tinge. Place it on a *clean* card the instant it is gummed, and put it under a smooth, and sufficient weight to press till dry. Professors have a small screw press for the purpose. Be careful to lay it between two *very smooth* flat surfaces, in clean paper.

"Take care, *when painting from the* LIFE, or any absolute model, to have a proper degree of shade and colour, *placed* behind as a back ground, to give the best relief possible to your subject; *some compound tint*, approaching to neutral is (in my opinion) most suitable; but on this point, *genius* takes a free commission, only observing, that if you paint a back ground to your picture, *darker* than that which is really opposed to your subject, and *then* study the flesh tint from the life, while sitting as first proposed, you are liable to *colour* and *shade* it as much darker than nature, as your *painted* back ground is.

"Now consider how little of any *round object* presents itself full to the light and to your eye, at the same time that *space* is all which will require the pure local colour; and the extreme points of projection in these, will shine in some degree, and approach to whiteness: this is

easily produced by scraping the colour off. The true and peculiar form of these lights must be as nicely observed as the shape of any of the features or shadows—under *this consideration*, that perhaps a sculptor may, after the picture is finished, be employed to make a model of the same subject; and your picture may happen to be the *only means* he can obtain for that purpose; but a greater reason for correctness may, and ought to govern your study—*truth* and *excellence* demand your best on all occasions.

" The true brilliancy, or natural effect of colours, depends much on a judicious subordination to that light which illuminates your subject.

" Every gradation to shade is a gradation *from* the purity of colours: this may intimate to you that carmine and lakes will not be found necessary in those parts; which enable you to insure a greater certainty of the durability of the colouring of your picture, because the less brilliant colours are much more permanent than those of the lake kind, and often form the tint required.

" I have seen a very natural effect of flesh colour in a miniature of a gentleman of a tolerable complexion, declared (by the painter) to be entirely painted with Indian red, yellow ochre, and indigo only; but yellow ochre does not work pleasant, yet I have experienced that much may be done with those colours, enough indeed to secure a durable vivacity of colour, when the more delicate tints have faded.

" A speedy way of laying a colour for a dark cloth coat is, to mix white enough with the colour you would use, to make it dry to the lightest part of that colour; as thus, for dark blue, mix Prussian blue and Indian red, with white, till

it will flow like cream: lay this over the space you intend for cloth, and it will dry light enough to shade on, with indigo, lake, and Indian ink: the Indian red is requisite to counteract the coldness of the blue. Indigo, Indian red, and yellow ochre, will mix to a good black, which will take some shadow by Indian ink used without gum water, and afterwards deepened with gum water only. But the most genuine way is to *paint* the whole in the transparent manner of painting flesh. Yet many good inferior tints may be produced proper for back grounds, with indigo, Indian red, and yellow ochre, by mixing them as a *body* colour, and floating them on the ivory when laid flat, which should remain so till the colour is dry; and, as all body colours dry different to their wet appearance, it is a good precaution to try the tint on a piece of spare ivory, and dry it by the fire.

" Some painters put silver foil behind the ivory to force a brightness, but the foil is liable to tarnish, and hurt the effect. Perhaps great care might avoid the tarnishing of the foil: it adds much to the brightness of the colours under which it is placed. Some tint the ivory, behind the parts where white drapery is to appear, with a neutral tint, in order to take off the yellowness of the ivory; but this is not practised by the best painters. Their reason is, that the ivory becomes opaque by time, and shuts out the effect of the colour put behind, leaving the front, in the same degree, meagre for want of it. There must not be any *bits* of paint seen on a miniature; all must be delicate, and as impalpable as possible, enduring the magnifying glass, and improving by the trial; and if you can touch so fine as to make the working imperceptible, so much

the better, if you pay due attention to the greater requisites of the work; as smoothness (merely) is not a perfection, unless accompanied with the rest. A Birmingham tea-tray has smoothness in the highest degree, produced by varnishing and polishing; yet what pictures do they exhibit? Their manufacturing expedition will not admit of the time requisite to paint a *good picture.*

"Always determine that your present work shall be your very best, and wait patiently and attentively for the completion of your picture, before you indulge your flatterers with the opportunity of praising you. It is an intoxicating tribute, and should be received with great caution. When application and experience have rendered your essays worthy a genuine compliment, your constitution for praise will be proof against many of its bad effects.

"In the early stage of your picture, do not be over eager to make it look pretty with *colour;* but proceed patiently with your neutral, or modelling tint. This will look cold, till you begin the complexion; but when that is properly added, you will find the neutral tint vanish, and the whole will appear flesh: take care to preserve a coolness in the *retiring* parts, unless reflected on by a warm colour.

"You may touch broad and general at first, to gain your masses speedily; but rather lean to the careful style, and freedom will arrive, in its proper time, as far as it is possible in this minute sort of work; for you must never expect to perform a highly-finished picture speedily. The only possible means of gaining time, is to learn what *you*

have to do: with this sort of forecast much time may be gained.

"Habituate yourself to look enough at your subject, to learn to a certainty that your next touch will improve your work; and draw *what* you *see,* and *as* you see it, or what you *know* to be, may deceive you. For instance, you know the top of a wine glass to be a circle; yet it generally stands in a point of view to appear an oval; but this belongs to the science of perspective, which should be clearly understood before you can expect certain *success* in any department of painting. When you have made yourself thoroughly acquainted with the methods I have given, and can practise accordingly, I shall see by your performance wherein either the tutor or pupil is deficient, and will make my remarks thereon the subject of another letter; and remain, Madam, your obedient servant."

Letter XX.

"MADAM,

"I EXPECTED the neutral tint would not meet your entire approval at first, as it is very difficult for a young practitioner to look on a fine complexion, &c. without being drawn off from the consideration of a colourless form; but if you can persevere in preserving the three distinct properties in your subject separately (if only in idea), your work will proceed systematically; and if you

perfectly comprehend that a *true* outline *must be obtained,* and that mere *lights and shades are not local colours,* and also that *the local colour must* be general *in both light and shade,* I have no objection to your *carrying all on together;* but, in my humble opinion, it is to be compared with a young musician attempting to play three parts at once. Your queries about the colours of reflections are very pleasing proofs to me, that you think on what you do; and the vast variety on which they depend, admits only of a general conclusion, in answer. You have already been told that reflected parts are, in general, warm or yellowish; and that retiring parts are generally cold or blueish: these two would produce a tint of a greenish hue, but that they will *compound with the complexion;* which, like all other triple compounds, become to a certain degree neutralised; therefore, from the many circumstances which may occur to vary any given rule,—reason, practice, and observation of nature, must be your guide. *These are the parts of a picture* which depend on the harmonizing power of the eye. *Genius* must here find proof from reason, as no effect can be relied on, where the cause is not clearly understood to exist, and rest on a better origin than either fancy or even uninvestigated examples: yet rather follow *well-recommended* example, than doubt or object while your own judgment is immature, and (with study) the knowledge of the cause may unfold itself to your satisfaction as you proceed.

"That kind of faculty is necessary to succeed in the department of fine and harmonious colouring of [illegible] reflected on, which is either natural or acquired [illegible] musician who is master of the VIOLIN; *taste* and *practice* enable him to stop, or finger the strings, in tune

on a piano-forte, that faculty is fully provided by the tuner of the instrument.

"I observe that you leave the shading of the globe of the eye, or that part which *is* white, too much so, and unfinished: you must consider how small a portion of absolute white would be found on a white globe; and when you attend to its overshadowed situation, by the thickness of the eye-lid, and the additional shadow caused by the eye-lash, you will find it impossible to have any real white in a well-painted eye, except the glittering reflection of the light, which will be but one speck, and must be placed with the utmost attention to the original.

"In answer to your question, How must I paint white drapery? I can assure you there will be a very small portion of *white paint:* you must form the whole by tender delicate shading, with a cool neutral tint; and the whiter you bleach your ivory the better, both for this as well as all other colours. The reflection tint, and also the retiring, must be used in white drapery: and when all is nearly formed, touch the edges of an hem, or the points of lace, the highest lights on the shoulders and breasts, with fine white; which, if done according to your model, will produce a true effect of white drapery. Need I say, heighten the lights on pearls with one speck each of the fine white, and the glittering of diamonds, gold, silver, or satin; tinting them afterwards to their peculiar effects with a thin touch of suitable *transparent* colour.

"To paint hair well is very easy, when compared with the drawing and composition of it. This is one of the great tests of true taste: the colours to be used in hair can only be dictated by its local colour, with this radical

observation, that hair is transparent and glossy; all the lights will be cold; the absolute shades will be tempered with the colour of the hair in a very small degree; the less absolute shades will have more hair colour; and the parts which neither shine nor are in shadow, will be the colour of the hair. These are the best directions I can offer for a general rule; but you must study these matters according to the circumstances of light, shade, reflection, and their own peculiarities. The local colours which commonly occur in hair, are, burnt umber, Vandyke brown, and sippia, with various gradations of Indian ink, brown madder, and indigo, as shade; but reflection will so affect any glossy matter, that all must be ascertained by the accompanying circumstances.

"It is not very good practice for a young student to work on the flesh in the absence of the subject; but this must be regulated by your own confidence in what you know may be safely and truly done, to forward the picture; for instance, where time is an object, you may have attained all your drawing and shading by a bold, broad, and open touch. In such a case, an *experienced* artist would sit down to his work, and proceed to fill up all the spaces, uniting all to one agreeable state, with the colour or shading suited to each part, preparing his picture well for the next visit.

"You wish to know *how long a* good miniature ought to be on hand—I cannot give you any direct answer; but must say it is a question that no painter ought to ask. *Patience, perseverance*, and sufficient ability, will complete a picture in *proper time*. You must make up your mind to this fact; that *painting well*, as it is one of the most

rational and delightful amusements, will always remain one of the most difficult: it may, perhaps, in this respect, be classed with such wonderful feats as *dancing on a rope*, or standing on a horse's back when in full speed, or the like, requiring extraordinary exertion both to attain and practise with success. *Ambition of excellence, necessity*, or a *natural impulse*, must be the stimulus: I hope the first and last of these you possess. Had I been writing to a gentleman, I might have observed that they are two excellent spurs to Pegasus, and should conclude that a bridle would also be requisite to restrain your muse to a regular pace. If what has been communicated may be the means of rendering your journey towards Parnassus more easy and certain than it otherwise would have been, I should feel the utmost satisfaction, and shall ever remain,

"Madam,

"Your obliged, obedient servant."

Letter XXI.

MADAM,

I should endeavour to comply with your demand on the art of painting in crayons, had not the late Mr. Russel superceded the best I could say on that subject, by the publication of a complete treatise; not only of the art of using, but also of making crayons, to which I think it best to refer you.

My practice in crayons has been chiefly on very small portraits, and effects of evening scenes, generally on vellum. I shall not withhold from you the methods I have found to answer, as far as my experience in this mode of painting has qualified me; but by no means would I be understood to offer it in lieu of the work to which I have referred you.

My first care is to get good materials. *The Swiss crayons* are (in general) the most pure. The vellum must have a soft velvet-like nap, or smooth roughness, on the outside the skin, sufficient to hold the colour: this must be strained tight, by tacking on a straining frame, on which should previously be pasted a piece of stout *white* drawing paper. When the vellum is strained, set it in the sun, or at a distance from the fire, to harden; then, with an elastic cane, or the like, beat it well, to discharge all the whitening which the manufacturers leave in it: this makes it take the colours more plentifully, and gives the dark ones their full force.

I first draw my subject as correctly as I can with charcoal; touching very tenderly, or the vellum will take the black too freely, and retain too much, if used too boldly. When the drawing is sufficiently marked, I flap off as much of the charcoal as I can, and there will still remain a very visible outline: I then begin the painting, by covering all the darkest masses with the darkest tints; using *as little of the crayon as possible*, and driving or spreading it with a leather stump, leaving no more paint on the part than sufficient to stain it (nearly) to the depth and colour I wish; bearing in mind all my elementary laws, respecting the proper effect as to light,

shade, and colouring; and covering the whole vellum as quickly as I can in the above manner, to obtain somewhat of a general idea of what the picture is to be. Thus, having overcome the whiteness of the vellum, I proceed to study the portrait, using (if a small picture) a neat-pointed, hard-rolled paper stump; preserving the lights broad and untouched, and marking the shade deep, but very spare of crayon; thus I proceed till all is *tinctured*, rather than *covered* with paint; taking care to keep the parts full as deep in the shades as can be required at the finish, and the lights as *bright* and *pure* as possible, never suffering a light tint to cover a part which must ultimately be a shade, as that would produce a chalky effect. In these small pictures, I can *mark* much of the drawing (with a passable effect of truth as to colour) with the hard native black and red chalks. [There is a good deep black composition, called Conti chalk, very useful in its proper place.] I now begin to touch with the crayons, sufficiently with regard to quantity, to cover the whole of the flesh as near to nature as I can.

I then carefully blend or soften them together with my finger, pressing a little, to fix the colour firm in the vellum.

The stump must now be laid aside, as it rubs off the colour. Take care that the whole is just covered with paint in the lights, *and as sparingly as will cover* in the shade; as it is a great accomplishment to arrive at the true effect without a superabundance of colour.

If a wrong colour is laid, it can be scraped off very safely, without injuring the vellum; then cut a hole in a piece of writing paper, the shape of the place you would

clean; lay it correctly over the part, and rub it with crumbs of bread.

When blending the colours, observe that the dark tints rise through the light ones; and, on the contrary, the light tints will weaken, and always chill the colour of shades; but this may be all turned to advantage by much practice, and more reflection, so as to ascertain the desired *effect*.

A *red tint* of the *pink* class will clear any dirty part of flesh; a tint of a light-greenish cast will *take down* red in reflected parts, but must never touch the full lights of flesh. If you regard the durability of your picture, paint with such colours as are strongest in their original natural state: ochres, umbers, and earths, both raw and burnt, are of this description, and agree best with the whitening with which crayons *should be* made up. *Fine genuine lamp black* is the only black that should be used in crayons.

The best white for the general mixture with *all the colours*, is the *flake*, or uppermost strata of the whitening, when it is in pulp, in large quantities, at the manufactory, ready for moulding, because all the gross and heavy matter has precipitated towards the bottom.

Some think they procure this flake by dissolving a few lumps of whitening: but it is inferior; because, after all it is only the flake of an inferior strata. *The pure first flake of the whole* is worthy the trouble of applying for at the manufactory. *Hume's white* might be used for *entire white*, and some of the finest tints of the three principal colours may be embodied with it.

The late Mr. Morland (father to the great genius of that name) made the very best crayons I ever possessed.

Sufficient grinding of all the colours is an important

object. They may be made up with various glutinous liquids. Skim milk, small beer-wort, and common gin, are the three generally used: the clearness of gin suits the light tints. Mr. Morland used gin as the best of the three for the purpose. Beer-wort will do well enough for all the darker tints. Practice and experiment are *wanting* in this department, which I leave to the ingenious and industrious, under the assistance of the treatise recommended.

Provided you make no more use of the following expedient than just to ascertain the best manner of first laying on the crayons, you may depend on its great efficacy. I find this caution, as apology, proper; because the examples I shall propose, although (*manufactured*) from the works of eminent artists, are far below that perfection, as pictures, which is wisely recommended for the proper formation of the best style, and are as much inferior to ultimate excellence as the rough *foundation* stones of a pedestal are to that out of which the statue should be formed; from which I argue, that the proposed subject for imitation being intended as a sort of *foundation* only, on which future excellence may find a certain support, I shall forthwith venture to shock the lofty taste of those who scorn progression; and, if I may so describe my ideas, "*are always jumping at the pinnacle.*"

Paper printed in colours, for the hanging or ornament of rooms, is printed with a certain number of blocks, ingeniously matched, so as to complete a certain effect; each block performing its part by an impression of one of the several colours required in the pattern: by which means you obtain as perfect a representation as the association of the several separate tints can produce. There

are some productions of this sort, particularly of *ripe fruit, flowers, &c.* (broad bordering) of so good an effect, that I have proved them to be an excellent *first* key to *using* crayons; because each tint has its distinct shape, and can be easily matched in a full set of crayons; which, with their softening property, may be finely blended together with the finger, so as to produce at least a very finished and pleasing effect. By copying some of these with tolerable mechanical precision, and having learnt therefrom how to arrange the first lays of colour, you will have finished the foundation, and must proceed to the finest specimens of painting, and of nature, to complete your system.

With regard to painting in oil, I shall say little more than refer you to the only book I think adapted to give an idea of the systematic use of the materials—"*Bardwell's Art of Painting in Oil Colours,*" which is sold at Laurie and Whittle's, Fleet-street, (price 1s. 6d.) will give any one a very pure and proper method, who *begins* with his instruction. I know systems of this sort are under the prejudice of those who have previously habituated themselves to other modes; but so far as the choice of materials, and the preparation and arrangement of them for the pallet, and the application of them to the canvass; it may be safely adopted in preference to the practice of those; whose works would have been a *lasting* ornament of the art, had their methods and materials been better understood.

An old experienced artist (whose works are sufficient evidences of the truth of his testimony) assured me, that spirits of turpentine mixed with a very small portion of good nut oil was the only vehicle he made use of in

painting; which, when finished, had a dry calcareous appearance; but when varnished with *mastic* varnish, all came forth with excellent effect, and would *neither crack* nor *change colour* except from the slow, but certain power of *time*, on all similar materials.

A method discovered by Mr. Cornelius Varley, of preparing the resin called *gum* copal, as a vehicle to supercede the use of oil, in painting, will shortly be made public.

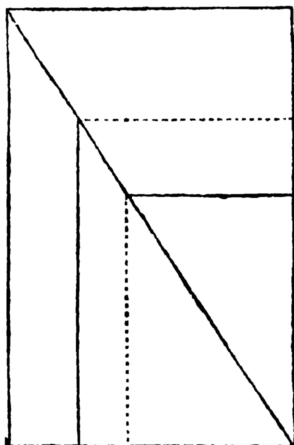
The regular sizes of canvasses, and their technical names, are as follow: for which I am obliged to Mr. Brown, Primed Cloth Manufacturer and Colourman to Artists, 163, High Holborn.

	Measures.				
	ft.	*in.*		*ft.*	*in.*
A whole length	7	10	long by	4	10 wide.
A bishop's half length	4	8	———	3	8
Common half length	4	2	———	3	4
Small ditto ditto	3	4	———	2	10½
Kit-cat	3	0	———	2	4
Three-quarter size	2	6	———	2	1
Head size	2	0	———	1	8
Two smaller sizes {	1	9	———	1	5
	1	5½	———	1	2

Landscapes have no settled dimensions, but are often painted on the "*given sizes*," placing them on their sides instead of upright, as for portraits; thus, on asking the size of a landscape, a painter would answer, "It is a whole length size, landscape way," which, you are to understand to measure in length and width according to the measure given under the head "*whole length.*"

Whenever you would make a small copy of a picture, divide the original by whole numbers, so that the copy may measure exactly one half, one third, fourth, fifth, sixth, seventh, or eighth, &c., part of the original, both in height and width, because a fractional size will not produce an integral effect.

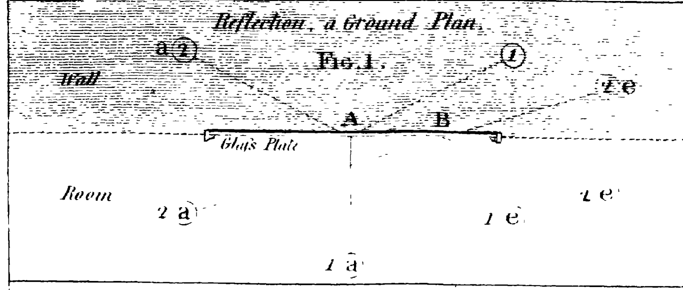
But should it be required to copy some particular length or width, the proportion to the original may be perfectly obtained, by drawing a diagonal right line, from one corner at the top, to the opposite corner at the bottom; then set up the given length from the bottom, parallel to the side, or width from the side, parallel to the bottom, till either touches the diagonal, and from *that* point the corresponding width or length, will be truly determined.



Finis.

J. Innes, Printer,
Wells-street, Oxford-street, London.

PLATE XV.



Ray of Sight

Reflection

Ray of Light

Ray of Sight

Reflection

Ray of Light

Reflection Fig. 2.
a Profile.